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IN THE SHIP YARDS OF THE GREAT LAKES.

The distribution of the six new Carnegie ore carriers—five steamers and a tow barge—among different works of the American Ship Building Co. is as follows: Detroit, one steamer; South Chicago, two steamers and one tow barge; Lorain, two steamers. Work on the steamer at Detroit is already under way, on the berth vacated a short time ago by the McMillan-McVittie steamer Admiral, and it is understood that the tow barge at Chicago, going down on a new berth, is also under way. It is expected that the two steamers to be built at Chicago will be put down Jan. 1 and 15, taking the places of two tow barges now building for the Minnesota Steamship Co. Jan. 15 and Feb. 1 are the dates fixed for putting down keels of the two steamers to be built at Lorain. These vessels are to be of the largest type of lake ore carriers, and the steamers are to have quadruple expansion engines and Babcock & Wilcox water tube boilers. The construction of two of the steamers at Lorain has necessitated the transfer of two of the four large Wolvin freighters to West Bay City, and it is understood that work is progressing quite satisfactorily on these vessels at the old Wheeler yard.

With the consolidated ship yards so tied up on orders for more than twenty large freighters that they can not undertake anything more for delivery in 1900, it is more than probable that the next order will go to either the Craig Ship Building Co. of Toledo, or the Union Dry Dock Co. of Buffalo. It is understood that either of these concerns will undertake to deliver a steamer of Welland canal size towards the latter part of 1900, and that they are now engaged in negotiations on that score. The Craig company has just closed a contract for a small steel passenger steamer to take the place of the Minnie M. on the Detour-Sault route. The new boat will be very fast. She will have engines of 1,200 horse power. She will be 185 feet long, 34 feet beam and 13 feet deep. Cylinders of her triple expansion engines will be of 20, 33 and 54 inches diameter with a common stroke of 36 inches.

A wooden steamer to be built at Marine City, Mich., by Alex. Anderson for John Corrigan of Cleveland, will be designed for the sand trade and will be similar to the Neff, which was also owned by Mr. Corrigan. Dimensions of this new vessel are 150 feet length, 38 feet beam and 9 feet depth of hold.

Mitchell & Co., vessel owners of Cleveland, have 6,000-ton steel steamers (ore carriers) named for Senator M. A. Hanna and for Mr. H. C. Frick. Now they have given the name W. E. Reis to another steamer of the same type in honor of the president of the National Steel Co. The Reis was launched at the Globe works of the American Ship Building Co. in Cleveland, on Saturday. She will be fully prepared for service on the opening of navigation in the spring.

LAKE CARRIERS' ASSOCIATION.

It has been decided that the annual meeting of the Lake Carrier's Association will be held at the Cadillac hotel, Detrot, beginning at 10 a. m., Jan. 17. At the last annual meeting of this organization it was agreed that the so-called individual vessel owner was fast dropping out of the lake trade; that the business was gradually drifting into the hands of a few very large corporations, and that if the Lake Carriers' Association was to continue it would be an organization different to that of the past—a very strong body made up of a few representatives of large interests. Probably this view may still be applied to the future of the organization, but not for the present, as more interest will undoubtedly attend the coming meeting than has been shown in two or three years past. The prosperity of the season just closing has made the individual vessel owner an important factor in the situation, but whether for only a year or two more remains to be seen.

The improvement of the St. Mary's river will very probably demand most attention from the lake carriers at this meeting. Senator McMillan of Michigan has taken the first step in this direction, in securing the passage of a resolution by the senate requesting the secretary of war to furnish information as to how many days the St. Mary's channels were blocked during the season of navigation just closed, and what is his opinion as to the desirability of opening additional channels. In answer to this inquiry the war department engineers will give full details of the recent blockades in the river and will show also that they have already recommended the enlargement of channels in all narrow parts of the river and the construction of new channels in some places. This will be the basis of recommendations that will be made at the Detroit meeting.

Major W. L. Marshall, United States engineer at Chicago recently opened bids for the construction and erection of four single and one double track steel highway bridges over the Illinois and Mississippi canal near Tiskilwa, Ill., and Wyanet, Ill. The lowest bid was that of the Toledo Bridge Co. of Toledo, O., $13,400. Other bidders were Massillon Bridge Co., Toledo, $15,000; Wisconsin Bridge & Iron Co., Milwaukee, $17,120; J. G. Wagner & Co. Milwaukee, $14,200; Chicago Bridge & Iron Works, Chicago, $13,690; King Bridge Co., Cleveland, $14,050; and Union Bridge Co., New York city, $20,500. The appropriation for the work was $20,000.

A new river steamer, the Rees Lee, recently completed at the yard of Capt. E. J. Howard, Jeffersonville, Ind., is making a most creditable record. She is 200 feet long and 38 feet beam, and on her first trip to St. Louis carried a miscellaneous cargo which included 15,000 feet of lumber, 6,500 bundles of staves, 160 bales of cotton and several hundred head of cattle.

LATEST REPORTS FROM THE SHIP YARDS.

VARIOUS ITEMS PERTAINING TO THE WORK OF SHIP BUILDERS, LARGE AND SMALL, IN ALL PARTS OF THE UNITED STATES.

The steel ocean-going tug which the Columbian Iron Works, Baltimore, will build for the New York & Hartford Transportation Co., will be 125 feet in length, 26 feet beam and 13 feet depth of hold. She will be fitted with engines of the inverted surface condenser and receiver type with cranks at right angles, the cylinders measuring 20 and 40 inches diameter and 28 inches stroke of piston. The deck house will contain two staterooms, two rooms for engineers and a room for the cook. The vessel, which will cost complete about $60,000, will be equipped with all modern auxiliary appliances, including hand and steam steering gear, incandescent and search lights and fire and wrecking pumps. The contract for this tug was given to the Columbian Iron Works as a result of the splendid service which they rendered the New York & Hartford company in the construction of the steamer Hartford, which was only recently completed at the Baltimore yard. The Columbian works has the hull of the torpedo boat Tingey completed and the laying of the deck has commenced. Finishing touches are being put on the revenue cutter Seminole and the tug Savage.

The Pacific Coast Steamship Co. of Seattle, Wash., announces that it will in the near future place contracts for three new vessels—a freight and passenger steamer and two steel schooners. President J. D. Farrell states that plans for these vessels have already been prepared and that bids will be called for within a few days. The steamer will have a freight carrying capacity of 1,500 tons, in addition to fuel, and accommodations for 150 first-class and 100 second-class passengers. She will have a speed of 16 knots. The schooners will each have a carrying capacity of 2,500 tons. The construction of these vessels is probably due in some measure to the decision of the Pacific Coast company to place steamers in service on the route between Seattle and Cape Nome, Alaska. The steamers Senator, City of Puebla and Williamette will be employed in this service, and preliminary to going on the route will be thoroughly overhauled and repaired by the Moran Bros. Co. of Seattle.

Improvements of various kinds continue to be the order of the day at the Roach Ship Yard, Chester, Pa. One of the latest is a new punch shed, 30 by 60 feet, the construction of which was begun a few days ago. The work of building the Hawaiian-American liners, now under way at the Roach yard, necessitates heavier machinery, and there will be set up in the new shed a number of heavy punches which have been stored away since the days when John Roach constructed monitors for the United States government. The steamer Pennsylvania, building for the New York, Philadelphia & Norfolk Railroad Co. to replace the burned steamer Cape Charles, will be launched within a few days.

A dry dock to be built at Hunter's Point, San Francisco, by the California Dry Dock Co. will be constructed from plans prepared by Engineer Holmes of the board of harbor commissioners of the city of San Francisco. The dock will be 750 feet in length, 80 feet wide at the bottom and 120 feet wide at the top. It will have 28 feet of water over the sills at low tide and will be capable, it is thought, of accommodating any vessel that enters the port of San Francisco. The cost will be considerably over $500,000.

In a letter to the Review, Messrs. Shea & McCarthy, proprietors of a boiler, tank and plate iron works at 128 Front Street, Memphis, Tenn., state that they are building the hull and boilers of a steel tug under construction for Mr. L. E. Patton, and the first steel or iron boat ever constructed in Memphis. The vessel, which is constructed throughout of quarter inch steel, is 75 feet in length over all, 15 feet beam and 6 feet draught.

F. M. Crawford of Tacoma, Wash., has begun work on the freight and passenger steamer which is to be built for Cook & Co. for service on the Tacoma-Seattle-Vancouver route. The vessel will be 162 feet in length, 28 feet beam and 12 feet depth, and will have an average speed of 15 knots with accommodations for one hundred passengers. She will cost $75,000. The contract calls for completion June 1.

The steamer Proteus, building for the Cromwell line, will be launched at the yard of Newport News Ship Building & Dry Dock Co. next Saturday morning. The Proteus is a sister ship of the Comus and the last of the steamers building for the Morgan and Cromwell lines at the Newport News yard this year.

Arthur Sewall & Co. of Bath, Me., some days ago launched the steel ship Kaiulani, designed for service between San Francisco and the Hawaiian islands. She is 250 feet in length over all, 225 feet between perpendiculars, 42 feet beam and 21 feet depth. She will have a carrying capacity of 2,500 tons.

The ship building plant of Charles Ward at Kennebunkport, Me., was badly damaged a few days ago resulting from the explosion of a boiler. The engine house was almost completely demolished.

The towboats Tide and Cyclone, building at Elizabeth Marine Ways, Pittsburg, for the American Coke Co., will be launched within a short time.

Andrew M. Moreland, the new member of the board of managers of the Carnegie Steel Co., Ltd., is the youngest man ever elected as a member of the board. He is only thirty-five years of age. He has been auditor of the company during the past four years.

ENGINEERING IN THE UNITED STATES NAVY.

BY GEORGE W. MELVILLE,

ENGINEER-IN-CHIEF, U. S. NAVY.*

In our society, the president has the widest latitude in the choice of a subject for his annual address, and, indeed, there is scarcely an established custom as to its nature; but it always seems logical for him to choose a theme connected with the work to which his life has been devoted, and in which he is an expert. This would make my subject "Naval Engineering," and there are several reasons why it is particularly appropriate at this time. Although one other naval engineer has been president of the society, his address had a different theme, and consequently the subject, at least as a presidential address, will be new. Every American is naturally proud of the fact that the first successful steam vessel was the work of an American engineer; but it is not so generally known that the first steam war vessel of any navy was designed by the same American (Robert Fulton) and was built in this very city in 1814. Had the war with England lasted a little longer there can be no doubt that the Demologos would have created a revolution in naval architecture; but the close of the war before she was completed rendered her active service unnecessary, and she was finally destroyed by an explosion of her magazine in 1829. The advent of the Demologos did not create an engineer corps, nor bring any engineers into the navy, so that the real beginning of naval engineering was when the steamer Fulton was built, and in 1836 Mr. Charles H. Haswell, the Nestor of engineering in this country, became the first chief engineer in our navy. The Fulton was a small vessel of only 1,200 tons displacement, or about what would now be considered a small gunboat; but she was the beginning of what has brought about as great a change in navies as the invention of gunpowder did in warfare. It is really wonderful to think that the man who was the first chief engineer of this first steam war vessel of our navy is still alive, in full possession of his faculties, and in the active practice of his profession today. One of his contemporaries some years since said that the engineer corps might consider itself very fortunate in having had for its founder such a man as Mr. Haswell, an educated gentleman and a thoroughly competent engineer. From the very first his every effort was devoted to increasing the efficiency both of the machinery and of the officers who were to care for it, and it is not going too far to say that he has left a lasting impression by his labors, the organization and scheme of examinations having long remained as he made them.

It is a little hard for the young engineers of today, whose training, while it may seem to them beset with difficulties in the way of intricate formulæ and abstruse calculations, is nevertheless complete, and makes them masters of an immense amount of accumulated information, to realize the difficulties under which the older engineers, even of the writer's generation, and much more so of Mr. Haswell's, labored. Mr. Haswell himself was one of the first to provide a reliable book of reference for the young engineer, where the results of experience were systematically arranged; but for Mr. Haswell himself there was nothing of this sort, and he had to create the precedents. When we look at the matter in this light, we are filled with admiration for Mr. Haswell and the men of his generation at their excellent solution of the problems which confronted them. Without going into a detailed sketch of the work done by Mr. Haswell, it may not be amiss to recall to your minds a famous old ship, the machinery for which was designed by Mr. Haswell, who, indeed, made all the drawings for it himself. This vessel was the Powhatan, which for many years was one of the finest of our old ships and rendered most efficient service. Probably every member of this society living near our eastern coast has seen this fine old ship. She was built in 1847, and remained in active service for forty years, a monument to those who had designed and built her. In those early days the average deck officer of the navy did not look upon the steam engine as a desirable addition to a ship, but simply as a necessary adjunct that had to be endured. There were, of course, notable exceptions, and Captain Matthew C. Perry, the first commander of the Fulton, was a liberal minded man to whom engineers owe a great deal. Yet, even he hardly rose to the point of considering that engineers were a vital part of the ship's complement, and as such should be made to feel that they were as much officers as any others, and their men were just as truly sailors. Neither Mr. Haswell, nor any of his assistants, were regarded, when first appointed, as permanently in the navy, and the assistant engineers were removable summarily by the commandant of the station. Some years ago Passed Assistant Engineer Bennett, writing for one of the reviews, in speaking of this circumstance, expressed surprise that the deck officers should not have realized the mighty force which steam brought to them and have embraced every opportunity to take advantage of it. It seemed, on the contrary, to belong to a different world from that in which they had been trained, and instead of endeavoring to become expert engineers, they regarded the machinery and all connected with it as a disagreeable necessity and left its development to the separate corps of engineers.

TRIBUTE TO BENJAMIN F. ISHERWOOD.

Among the older engineers were many men well known to all mechanical engineers in the country, who in a quiet way did very valuable work. Time will not permit, however, of mentioning them individually in such a survey as we are making. Some years before our civil war another great marine engineer began to attract attention—Benjamin F. Isherwood. He entered the navy in 1844, so that he is really a contemporary of Mr. Haswell. It is perhaps not exaggerating to say that he is the most brilliant marine engineer whom this country has seen, and his work has made his name known among marine engineers in all parts of the world. His fame will probably rest mainly on his record as an experimentalist, in which field there are few who have ever exceeded him, either in the amount or the excellence of the work done. The most notable of his experiments was the series which gave the complete demonstration of the relation between cylinder condensation and the rate of expansion. Until these experiments, most engineers believed that the law of Mariotte, that the product of pressure and volume is constant, was strictly applicable to steam as well as to permanent gases, and that a very large ratio of expansion with low pressures of steam would be profitable. Isherwood's experiments on the Michigan demonstrated conclusively that under the conditions there obtaining, of a slow-moving engine and a low steam pressure, a ratio of expansion was soon reached beyond which any increase would cause an absolute diminution of economy, instead of an increase thereof, as would have been predicted from a strict adherence to Mariotte's law. Every young engineer knows this thoroughly today, and is cautioned about it in his text-books; but so far from its being readily accepted when Isherwood's experiments had demonstrated the true facts, many will remember that he was assailed in the public prints as being guilty either of hopeless ignorance or wilful waste of the government money. Mr. Isherwood was not only a splendid experimentalist, but a designer of the first rank, and an executive engineer who has not been surpassed. He was engineer-in-chief of the navy during the whole of the War of the Rebellion, and during that time was responsible for a large number of designs. Here again he was criticised from the academic point of view, and yet the very faults for which he is criticised only appear, on proper analysis, the more praiseworthy as excellent details of sound designing. He was accused of building engines which were inordinately heavy, which accusation he has never denied. To the mere office engineer this was true, but he realized what they did not, that these engines had to go into the hands of men who were largely untrained and unfamiliar with machinery. The ordinary formulæ for design assume reasonably decent handling, and do not provide for the stresses due to ignorance and carelessness. Isherwood knew that the point of first importance was to build engines which would not break down, and, in fact, could not be injured by ignorant and careless handling. The result of this policy was engines very much heavier than would ordinarily be built; but they did not break down, and they carried our ships to victory. To my mind this was the highest proof of his talent as a sound designer. He had the courage to invite criticism from the book engineer in order that he might insure success for the country. You all know the story of the Alabama, and how she and her sister commerce destroyers drove our merchant marine off the ocean. The navy department felt it important to get a class of vessels that would be faster than the Alabama, or any other vessel likely to be built, so that they could sweep the seas of all these commerce destroyers. A number of designers were concerned in projecting both hulls and engines to accomplish this result, but although the great Ericsson was one of his rivals, Isherwood's ships were the only ones which really accomplished what was intended. The Wampanoag was the first of Isherwood's ships to be tried, and she was a magnificent success in every way—really in many ways the greatest success as a steam war vessel that the world has ever known, because she distanced everything that had preceded her so much more than has ever been accomplished before or since. The Wampanoag was given a trial lasting 37½ consecutive hours between Sandy Hook and Cape Hatteras, and for the whole run averaged nearly 17 knots per hour. During several 6-hour periods her speed was over 17 knots, and for several single hours she made over 17½. It should be noted also that this was not a smooth weather run, as the trial was ended prematurely owing to a gale, and for some time previous the weather was heavy. The speed made by the Wampanoag was at least 4 knots more than that of any other ship—either mercantile or naval—of her period, and, in fact, it remained the record speed for many years. Even the first fast cruisers of modern navies, like the Esmeralda and Naniwa, while nominally credited with a higher speed, only made it over the measured mile, or for a short spurt, while the Wampanoag's record was, as stated, for more than 37 hours. Another of the Isherwood ships, the Ammonoosuc, was given only a short trial, but showed qualities equal to those of the Wampanoag. The best of the rival ships made a speed of about 15 knots for less than an hour, and the other vessels fell below the Wampanoag even more than this. It is not perhaps generally known that in calling the Wampanoag an "Isherwood" ship the designation is more inclusive than might be supposed at first glance, for Mr. Isherwood was responsible for those features of the hull design which affect speed. The design of the hull as a whole was worked out by Naval Constructor Delano, an accomplished naval architect, but he simply took the form of hull as designed by Mr. Isherwood and worked out the structural details necessary to carry out his ideas. It would be supposed that Isherwood's brilliant achievements would have brought him only gratitude and thanks; but, on the contrary, his vigorous methods had aroused a great many enemies, so that at the end of his second term as chief of the bureau of steam engineering there was sufficient influence to prevent his reappointment to the office which he had so well filled, and he was banished to the Mare Island navy yard; but this only gave him an opportunity for some of his best experimental work, and the famous propeller experiments, which are still a mine of valuable information for designers, were conducted there with the assistance of Mr. William R. Eckart, a former engineer of the navy and an honored member of this society. After these experiments, and until his retirement, Mr. Isherwood conducted many others which have given valuable information to engineers, and it may be well in passing to remark that his reports of experiments are models to which all young engineers can refer with great profit to themselves. The thoroughness with which the apparatus under experiment is described and its dimensions given, the elegance and lucidity of the language, and the admirable arrangement, are all models of what such a report should be, just as Macaulay's style is so justly commended to all young writers.

From a remark which has just been made as to the qualifications of many of the engineers who came into the navy during the War of the Rebellion, it might perhaps be inferred that there were few men of real ability; but this would be unwarranted, and would be an entire mistake.

*Address of Rear Admiral Melville as president of the American Society of Mechanical Engineers, read at the New York meeting of the society, Dec. 5, 1899.

The total number of engineers was so large that it was utterly impossible to have even a majority of them skilled men; but a number of talented young engineers came into the service, and the profession generally has learned to recognize their ability from the fact that in the years since the close of the war a large proportion of the leaders in mechanical engineering in our country are men who were naval engineers during the war. The first president of this society (Dr. Thurston), as well as the second (Dr. Leavitt), were naval engineers, and so was that other able man, Charles E. Emery, now gone to his long rest. William Everett, who became famous in connection with the laying of the first Atlantic cable, was another, and so was George Westinghouse, whose wonderful achievements, both as an inventor and as the creator of great industrial works, entitle him to be called the Napoleon of industrial engineering. Theodore Cooper, the great bridge engineer, and Lay, the inventor of the automobile torpedo, were naval engineers during the war. We must also call attention in passing to Chief Engineers Alban C. Stimers and Isaac Newton, who brought the original Monitor down to Hampton Roads and enabled her to whip the Merrimac. But for their ability and indefatigable labors the results would have been very different. We might also recite case after case of gallantry and daring where vessels were saved by the skill of the engineers; where they lost their lives through attention to duty, or where they distinguished themselves specially in other ways, but time will not permit us to dwell upon these features.

During all the period which we have thus far considered, the engineers for the navy had obtained their education outside of naval influence; but in 1866 a class of young men was ordered to the naval academy to be trained as engineers in a naval atmosphere. A number of these gentlemen are still in the service, and were chief engineers of our large vessels during the recent war with Spain. In 1871 engineer cadets were appointed for the naval academy, the course being for two years only, until in 1874 a class was appointed whose course was to be for four years. These young men were appointed by competitive examination open to the whole country, and as the course became better known the numbers who came to compete increased, and their attainments became so high that an unusually able class of young men was obtained as cadet engineers. Unfortunately for the service, congress was seized with one of its periodical fits of retrenchment, and as no patronage was affected by abolishing the cadet engineer system, the separate course for engineers was wiped out in 1882, and for a time engineering education dropped out of the curriculum at the Naval Academy. It is probably safe to say that the young men graduated from the Naval Academy under the cadet engineering system presented a higher average ability than any equal number of young men from any of our great technical schools; indeed, so great was their ability that the service was unable to retain them, but the country has profited from the training they received by their work in civil life. A number are filling positions as professors of mechanical engineering in our leading colleges; a number are consulting engineers of the highest rank, and several are engaged in the management of our large manufacturing enterprises—one (who is a vice-president of this society) being the general manager of one of the largest electric companies in the world. It is a peculiar pleasure to me to bear tribute to the talents of these young men, because a great many of them have served as my assistants in the bureau of steam engineering, and while I am naturally filled with regret that the navy should lose their services, I also feel proud that my own judgment in estimating their ability should be so thoroughly confirmed by the esteem in which they are held by engineers outside of the navy. I would not have it supposed from my remarks about those who have left the service that they took all the ability with them. Some of the most useful and accomplished officers, graduates and non-graduates, are still in the service, which I trust will be able to retain them. In this connection, too, it is only right that I should bear testimony to the worth of the men who, at the naval academy, trained these young engineers. One of the earliest of the instructors was Dr. Thurston, the first president of this society, whose fame as an educator is world wide; but there were others who, while not so well known, nevertheless did splendid work. Just as I remarked at an earlier point about the work of Mr. Haswell and others as pioneers, so it was with these early instructors in engineering at the naval academy, who had practically no text-books, and who were compelled, in the professional part of the instruction, to depend almost entirely on their own experience; further than this, they had nothing to guide them in the way of a curriculum, and they were compelled to establish one tentatively and develop it as experience dictated.

BEGINNING OF THE "NEW NAVY."

Curiously enough, just about the time when congress was undoing the splendid engineering work at the naval academy, the navy department itself was formulating plans for vessels which should be designed along lines so different from those which had preceded that the familiar epithet applied to them—the "new navy"—is entirely appropriate. The labors of the first advisory board made available a mass of information, as a result of which congress in 1883 authorized the building of the four Roach cruisers, which were the beginning of the new navy. These vessels, I may say in passing, although possessing few features of novelty, as far as marine engineering in general is concerned, were nevertheless a marked change from the old wooden ships which had preceded them, and they rendered very valuable service, and are still, with modernized machinery, very satisfactory and useful vessels. In 1885, when Mr. Whitney became secretary of the navy, there was inaugurated a period of great activity and progress in the navy department, taking what had been done by Secretary Chandler, who started the new navy, and carrying on the work along the lines of logical development. Mr. Whitney's determination was to have ships which should be fully the equals of those in any country, and it was through him that the speaker was called to the position of engineer-in-chief of the navy in 1887, succeeding his life-long friend, Commodore Loring, one of our past presidents, whose reputation as an engineer is too well known to all of you to need any praise from me. I desire, in this connection, to say that no head of an office has ever been more fortunate in the young men who have been his assistants. No one has ever had the cooperation of abler men, and this has always been rendered with a loyalty and cordiality which deserve all the praise I can give, and I say with perfect frankness that if the progress of naval engineering in our country has been great during the past twelve years, it is due, in a large measure, to the cordial assistance of the talented young men who have worked with me.

I believe it is generally admitted that the machinery of our navy has been in all respects fully abreast of the latest developments, and in many respects we have taken the lead. One of the first things which may be mentioned is the fact that during the period before water tube boilers were used in any way, and when in some foreign navies there was a great deal of trouble with the shell boilers, due to the effort to get an abnormally large amount of work out of them, we had no such trouble. We believed in the principle of never sending a boy to do a man's work, and as a result we never had a boiler incapacitated through leaky tubes, and never lost a trial trip on this account, while failures of this sort were very common things abroad. One of the first things we did was to establish the use of water tube boilers and light compound engines for our steam launches. Private builders in this country had used water tube boilers, but the results, owing to the type of boiler employed, were not altogether fortunate. We found a boiler which has proved entirely satisfactory, and also developed light machinery which was also sufficiently substantial to stand the comparatively rough handling with which the machinery of small boats must inevitably meet. We are today the only navy which uses water tube boilers exclusively in its small boats. When we started, the effort was made to save as much water as possible, and small blowers run at a high speed were used for draught but the inevitable hum caused so many objections to be entered by officers of high rank that we were driven to the use of the steam jet. It was, of course, important that the most economical form of jet should be used, but when we came to determine this question we found that there were absolutely no reliable data in existence. As a result, we carried out a valuable series of experiments at the New York navy yard and found an exceedingly simple form of jet, which was also very economical, giving us a fairly high rate of combustion for a comparatively small expenditure of steam. It was evident to us that with the prevailing tendency toward continual increase of speed and power, with the accompanying increase of steam pressure, the shell boiler would at some near date have to be superseded by the much lighter water tube boiler, and we therefore invited a competition among the various manufacturers of water tube boilers, with a view to determining the one which, all things considered, would be best adapted to naval uses. Although this competition occurred about ten years ago, you are doubtless familiar with the circumstances, and that, as a result, we installed about 5,000 horsepower of Ward boilers in the coast defense vessel Monterey, this being at the time, and for several years, the largest installation of water tube boilers in any naval vessel. I am glad to say that these boilers have always given satisfaction and are still in use. At this same time water tube boilers of a different type were installed on one of our torpedo boats, and we have never used any other than water tube boilers on any of the numerous torpedo vessels which have been built since.

WHY ADOPTION OF WATER TUBE BOILERS WAS NOT HURRIED.

It would have been an easy matter, and it would have brought temporary praise to the engineer-in-chief, if, after the successful trial of the Monterey, we had at once launched out into the use of water tube boilers for all our vessels; but we felt that there had not been sufficient experience in their use to warrant us in making such an experiment in our first sea-going armorclads, and consequently, for a number of years, and even after foreign navies had begun to use water tube boilers extensively, we continued to use the shell boilers in our large vessels. Two years ago, when I felt that there had been sufficient experience to warrant us in the final adoption of water tube boilers, I recommended in my annual report to the secretary of the navy that we should definitely adopt water tube boilers for all classes of vessels. For reasons altogether apart from the machinery, we were not at first successful in securing water tube boilers in the department's own designs in spite of my urgent recommendation, but the firms which tendered on the government's designs also offered to guarantee higher speeds if they were allowed to use water tube boilers and more powerful machinery in hulls of their own design. This I had advocated very strongly, and both the technical and daily press of the country had supported this position very heartily, believing that it would be a woful mistake for our country to build 16-knot battleships when the rest of the world were building ones to make 18 knots, and when by the use of water tube boilers we could so readily do it. I am glad to say that the department accepted the builders' offer, thus definitely adopting water tube boilers and securing the 18-knot battleships for which I had worked so hard. At the present time all our new designs include water tube boilers exclusively.

One of the notable improvements in design which we introduced for large vessels was the use of triple instead of twin screws. We were not the originators of this method, as small vessels in both France and Italy had demonstrated its success, and both France and Germany were building vessels of about 12,000 horse power with this system of propulsion. When it came to the design of the Columbia, the first of our commerce destroyers, with 21,000 horse power, I was satisfied, after careful study of the problem, that we would need to use triple screws to attain success. At the beginning I did not anticipate an economy in propulsion, and the adoption of triple screws was for structural reasons; but when the Columbia's trial occurred we found that there was a material increase in the propulsive efficiency. When the Minneapolis was tried shortly afterward with the same system of machinery, this fact of greater economy was again established, so that we now feel that triple screws are justified not only for numerous other reasons, but on the ground of economy. This arrangement of propellers has become very popular in a number of foreign navies which have followed it out on a considerable scale, and have built all their large vessels with triple screws. It is probable that we shall do the same thing in our larger ships of the new programme.

DEVELOPMENT OF OTHER ENGINEERING SCHEMES.

During our late war with Spain we developed and utilized two engineering schemes which had never previously been tried in actual

service—a repair ship and a distilling ship. The former is one phase of the modern method of treating large work by taking the tool to the work instead of bringing the work to the tool. The Vulcan was the equal of anything except a very large repair yard, and after the battle of Santiago she was almost invaluable in the much needed general overhaul of all the ships. Besides an admirable outfit of machine tools and engineering stores, the Vulcan was specially notable for using the first cupola ever installed on board ship. The distilling ship was fitted with a four-unit, triple-effect distilling apparatus capable of furnishing 50,000 gallons of fresh water per diem after use for some time with an economy of over twenty pounds of water per pound of coal burned under the boilers. With clean coils the Iris actually furnished over 100,000 gallons per diem. The bunker capacity is 3,000 tons of coal, thus giving a potential capacity of distilled water of 60,000 tons, or as much as twelve of the largest tank steamers. The advantages of a distilling ship over a "tanker" are very numerous and obvious. The war with Spain was too short to give a chance for great experience in any line, but the work of the Oregon stands out as a brilliant illustration of the fact that the modern battleship is not only the creature of the engineer, but is absolutely dependent upon him for success. You all know the story of Milligan's work as the chief engineer of the Oregon; of his ceaseless vigilance to keep everything in order and prevent any deterioration; of how he saved the good coal for the day of battle which finally came (though he was told it never could come), and, above all, how he persuaded Clark, the commanding officer, to have all the boilers ready all the time, although others had steam on only half the boilers and, where it could be done, half the engine power was laid off. I am firmly convinced that the brilliancy of the victory at Santiago is largely due to Milligan's skill and foresight, and, as I said, this case is direct proof that however admirable as a great fighting machine, the battleship is useless except in the hands of trained engineers.

During the last fifteen years naval engineering has shared in the general progress of all marine engineering, and has led in many respects. Wrought iron, which was formerly the mainstay of the designer, has practically disappeared, to be succeeded by mild steel, which is not only stronger but much more reliable, and the manufacture and inspection of which has been brought almost to perfection. There is little doubt that the great improvements which have been made in both engines and boilers would have been impossible but for the greatly improved material. One of the greatest improvements has been in the reduction of weight of machinery, and this has been due both to improved material and to radical changes in design. In the engine there has been a better disposition of the material; and the use of hollow instead of solid shafting and other large pieces of forged material, the use of steel castings, etc., has been instrumental in enabling the use of higher pressures, and particularly of higher rotative speeds. These rotative speeds have become possible since we have learned to design the propellers on rational principles. In the old days, as you are well aware, the rule was to make a propeller as large as possible, consistent with immersion, and this, on account of the empirical rules for the ratio of pitch to diameter, necessarily kept down engine speeds. Now we know that within reasonable limits we can design a propeller to suit almost any engine speed; consequently, we are left free to adopt as high a rotative speed as is desirable and consistent with safety, assured that we can afterward design an economical propeller to fit it.

In the boilers, the reduction of weight has been due, apart from the more recent opinion of the water tube type, to improved material, and especially to forced draft. This, as you are doubtless aware, is an American invention almost contemporaneous with Fulton's early steamers; but it had almost disappeared, and after a brief revival under Isherwood during the civil war, had again died out until it was taken up in some of the foreign navies. At the present time no naval machinery is ever designed without the use of forced draft. Pressures have been gradually rising, and even with shell boilers as high a pressure as 200 pounds has been employed; but with the present plans of using 250 pounds at the engine, with either triple or quadruple expansion, and some 25 or 50 pounds more at the boilers, nothing but the water tube boiler would do.

At the present time it seems as though we had practically reached the highest development possible with existing types of machinery for naval purposes, leaving the designer room only for greater perfection in details. We do not, of course, believe that finality has actually been reached, and it is possible that some radical change may take place which will give us a new type of machinery. Some of the more enthusiastic members of the profession think that the steam turbine is to be the successor of the present steam engine, and assuredly the performance of Parsons' Turbina is sufficiently remarkable to justify the most careful study and further experiment. It is very interesting in this connection to know that in this country the development of the steam turbine is in the hands of one of our famous engineers, who is also one of the honorary members of this society—Mr. George Westinghouse. He has been developing the steam turbine with special reference to its use in driving electric generators, and some of the results already obtained are very remarkable. With his characteristic energy and courage, he is not satisfied with results on a small scale, but is now getting out a steam turbine to develop about 2,000 horse power on a single shaft, and when this has been built and thoroughly tested we shall be in a position to appreciate more thoroughly the bearing of this form of prime mover on naval engineering.

Rear Admiral Melville's paper concludes with a summary of matters pertaining to the navy personnel bill that is not new to readers of the Review. He says finally: "A natural inquiry will be, how successful is this measure (personnel bill) in actual practice? To this the answer is that any such change must, of necessity, require time, and it is too early yet to speak of results. I wish, however, to put on record my opinion that if the administrative details necessary to carry the law into effect are worked out with an honest desire to give due effect to its plain intent, and with a desire to make it a success, the results will be all that can be wished, and we shall have the most efficient navy in the world. If, through any unfortunate combination of circumstances, which, however, I can hardly believe possible, there should be any temporary indifference or opposition on the part of those in authority, the result can only be lack of efficiency and disaster in case of war until the intent of the personnel board and congress is put into working effect. It may occur to some who have only looked into the matter hastily that this scheme of amalgamation is contrary to the spirit of the age, with its tendency toward specialization; but, as an actual fact, the reverse is true. The misapprehension comes from a failure to thoroughly consider the case. When it is proposed to make every naval officer an engineer, we mean an engineer specially fitted for the work to be done in the navy, just as the other training of the line officer is for the duties which come specially to him; in other words, this new line officer—the fighting engineer—is to be a specialist in the very best sense of the term; that is, a man who has been specially and thoroughly trained for the work he has to do. In the past, engineering has been hampered at times in our navy on account of the subordinate position which its representatives held in the naval organization; but in the future, as the whole body of naval officers will be engineers, we have every reason to anticipate an era of progress and efficiency greater than has ever been known in the history of navies. We of the old school have lived to see our fondest hopes realized in the proper recognition of our beloved profession before we have actually ceased to participate in its active work. We linger with fond memory over our trials and discouragements, as well as our successes, and we may, perhaps, realize that some of our successes have been due to the stimulus of opposition; nevertheless, it does not make for success that when one is honestly doing his best work he should feel that much of it may be in vain on account of senseless opposition and failure on the part of those in high places to appreciate it; and as we older men leave the scene of action and pass on our work to the younger generation, we can congratulate them heartily on starting out under circumstances which are so infinitely better than those of our time, and which give them so much greater opportunity for highly efficient work for the republic."

NO TIMBER DRY DOCKS.

STRONG ARGUMENTS AGAINST THEM ARE AGAIN MADE IN THE ANNUAL REPORT OF REAR-ADMIRAL ENDICOTT, CHIEF OF THE NAVY BUREAU OF YARDS AND DOCKS—SUPPORTED BY THE SECRETARY OF THE NAVY.

WASHINGTON BUREAU, MARINE REVIEW, 1345 PENNSYLVANIA AVENUE, WASHINGTON, D. C., DECEMBER 13, 1899.

As might have been expected, the annual report of Rear Admiral Endicott, chief of the bureau of yards and docks, navy department, which has been forcibly endorsed by the secretary of the navy, makes an urgent plea for the additional appropriation necessary to have all four of the large graving docks now under contract constructed of masonry. It will be remembered that the last congress, in addition to providing for a floating dock at Algiers, La., provided also for masonry dry docks at Boston and Portsmouth; but for Mare Island, Cal., and League Island (Philadelphia), the act specified timber docks. The department has made contracts for these timber docks with the Atlantic, Gulf & Pacific Co. at a cost of a little more than $1,500,000 for the two, but still hopes that congress will give authority to modify the contracts so as to build them of concrete and stone. The Atlantic, Gulf & Pacific Co., the members of which have had several years experience and have done creditable work for the government hitherto, was organized under its present name about eighteen months ago, shortly before it received the contract for the Mare Island dock. Mr. George W. Catt is the president of the company and Mr. H. S. Wood its secretary and treasurer. Its offices are in the World building, New York; No. 42 Market street, San Francisco and Marquette building, Chicago. The navy department regards its equipment for dredging, for the construction of canals and for land reclamation, as well as for the building of piers, docks and foundations of bridges, very complete indeed. In support of the proposed change of contract, Rear Admiral Endicott says:

"This recommendation is made because docks constructed of masonry are more substantial, safer, and more permanent than those constructed of wood, and further because, while the first cost of such docks is greater than that of docks constructed of timber, they are much cheaper and more economical in the end. While these propositions may have been regarded in the past by many minds as theories, they are fully established by the experience of the navy department at the present time. When the government contemplated entering upon the construction of dry docks for the navy in the early part of this century, congress provided that the secretary of the navy should call in to his aid some skillful engineer to locate and design the dry docks to be authorized. No attempt was made to restrict the department in the quality or character of these structures or in their location, but these were left to be such as the secretary of the navy, with the assistance of expert advice, should determine to be for the best interests of the service. Under the authority conferred, the department called in an eminent civil engineer, Col. Loammi Baldwin of Boston, first as designer and then as constructing engineer, and the result was the construction of two masonry graving docks, one at Boston and one at Norfolk, which are classed with the finest examples of work of their kind in this or any other country. These two docks are in service in the navy today, after a period of sixty-five years, in good, substantial condition, with almost an insignificant cost for repairs upon the dry dock structure proper since their completion in consideration of the long time they have been in service.

"The first of the large timber dry docks that have caused us so much trouble was completed in 1889, the last one in 1898, and while the service has extended over only a few years, the experience has been such as to demonstrate conclusively that timber graving dry docks of the capacity required by the navy are really expensive temporary structures, unreliable and unsafe. In urging in favor of the timber dry dock its smaller relative cost, it has almost invariably been based upon the difference of cost between a timber dry dock built by contract and either the New York or Mare Island stone dry dock, which latter were built by days' labor, the

work extending through a long term of years. The proponents of the timber dry dock point to the large cost of these two dry docks in every comparison, and are silent as to the moderate cost of the two masonry dry docks at Boston and Norfolk, which were built under more favorable circumstances. In the long run the timber dry dock is much more expensive than one of masonry. A masonry dry dock, built by contract after public competition, can be built in about the same time as a timber dry dock, at a moderate increase of cost and a small annual outlay thereafter for its maintenance, as against a timber dry dock about one-fourth cheaper in first cost, with a large annual expenditure for maintenance, amounting to a practical renewal every thirty years or less.

"The experience the navy has had with timber dry docks has demonstrated, if such demonstration were necessary, that such a dry dock is a temporary structure. Docks of this kind in private establishments, where the cost of repairs is being kept down to the lowest level, have not been very expensive in the early years of the dock's life, but at from twenty to twenty-five years of age they have required repairs so extensive in character as to amount to a practical rebuilding of the upper portion of the structure and frequently its entire reconstruction. Private docks have been cited as showing that when built of timber they require no extensive repairs for many years, but these structures are not kept in the state of repair which the government requires in all its works, and the results are showing that the extensive renewals or rebuilding in the case of these docks will come much earlier than in private docks. Not only are these repairs proving to be great in extent and cost, but they are carried on with inconvenience in the working of the dock or the entire suspension of its use, and these are considerations of much more importance in the naval service.

"It is of the utmost importance that a dry dock be absolutely safe. Its collapse might prove to be exceedingly disastrous to property and life. A valuable war vessel, costing several millions of dollars and containing hundreds of lives, should not be placed in a dry dock which is not absolutely safe in every respect and about which there is no doubt. Accidents of more or less serious character have occurred in the timber dry docks, but none has ever yet developed in a masonry dry dock, and the advantages of the latter in the matters of stability and safety are immeasurably greater. Dry docks are structures about which, when built, there should be no doubt, and it is quite safe to sav that such freedom from risk in the case of a very deep dock can only be obtained from one built of masonry. The highest authorities upon the construction of dry docks state that preference is given to those of stone because of their stability.

"A dry dock is a great work and should be, like other works constructed for the United States government, of the best and most substantial character, and an example in every respect of the best practice in constructions of its class. All other first-class powers of the world are building graving docks of masonry of the best, most substantial, and enduring type. Their examples ought to be of value and have some influence in determining the question for us. These nations are striving to make a naval establishment the best in every respect, and their course with reference to dry docks is to build of masonry of the most substantial character, those which once built of timber having long since abandoned such construction. It is believed that there is not a single example of this latter construction in timber to be found in the navy of any country which ranks as a good naval power. The estimation in which timber dry docks are held is well illustrated by the action of the German government in regard to granting a subsidy to a large graving dock to be built at Bremerhaven. A dock of the largest size was projected, and the government was ready to pay an annuity in order to have the use of the dock for naval purposes when occasion should require, but when it was met with a proposition to construct this dock of timber it declined to make the grant, and ultimately consented only upon condition that it should be built of masonry. The United States government is content with nothing but the best in respect of everything else constituting a part of the naval establishment, and it should be satisfied with nothing but the best dry docks."

Rear Admiral Endicott asks for marine railways at Portsmouth, N. H., Brooklyn, N. Y., League Island, Pa., Norfolk, Va., Port Royal, S. C., and Mare Island, Cal. These railways are particularly requested, he says, in order that torpedo boats and small vessels may be taken out for repairs quickly, at small expense, and without recourse to the large dry docks needed for the use of larger vessels.

AN INTERESTING GERMAN CABLE SHIP.

The steamer Von Pobielski, the first cable vessel ever owned by the German government, was recently launched at the yard of David J. Dunlop & Co., Port Glasgow. The vessel was built more with reference to the requirements of cable repairing than cable laying. She is a twin-screw steamer of light draught and has a length between perpendiculars of 255 feet with 35 feet beam. Her two sets of engines will give her a speed of 13 knots when loaded, and her builders claim that this will make her the fastest cable vessel afloat. The ship is flush decked and is fitted throughout with electric lights, a search light and other modern improvements. The cable machine installed is of the largest size and of modern pattern. The steamer will be engaged principally in the repairing and laying of the German government cables in the North sea, the Baltic and channel.

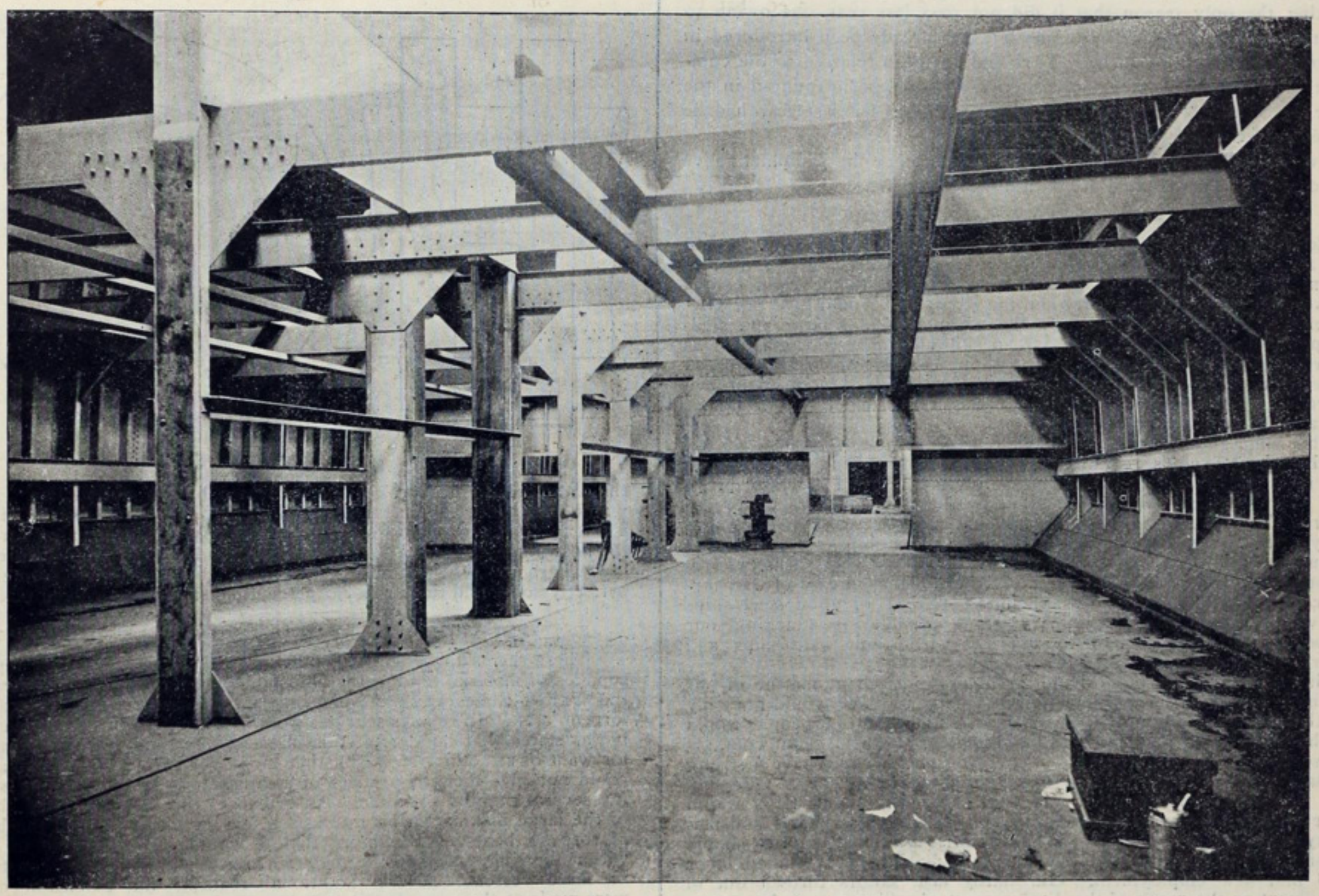


Photo copyrighted, 1899, Detroit Photographic Co.

HOLD OF A 6,000-TON ORE CARRIER OF THE GREAT LAKES—STEAMER ANGELINE.

American firms have secured some very handsome contracts for machinery for the marine shops of the Chinese Eastern railroad to be established at Port Arthur. The Cleveland Punch & Shear Co. of Cleveland, has just shipped a set of bending rolls weighing 33,000 pounds, and the Hilles & Jones Co. of Wilmington, Del., included in a recent shipment a large punch and shears.

The Nickel Plate road offers to students desiring to return home for the holidays the special rate of one and one-third fare for the round trip. Tickets will be sold on the day school closes and the day immediately preceding, good returning to and including the date school reconvenes, but not later than Jan. 10, 1900. 182, Jan. 1.

"DON'T GIVE UP THE SHIP."

THE MARINE REVIEW'S APPEAL, MADE UP OF LETTERS FROM HON. JOHN D. LONG, SECRETARY OF THE NAVY, ADMIRAL GEO. DEWEY, REAR ADMIRALS SAMPSON AND SCHLEY AND MANY OTHER PROMINENT CITIZENS, IS IN THE HANDS OF ALL MEMBERS OF CONGRESS.

A neat pamphlet of some sixty pages on the subject of the United States merchant marine on the oceans, made up from numerous letters printed in these columns during the past two or three months, is now in the hands of every member of the fifty-sixth congress. Arrangements for the distribution of this pamphlet in both the senate and house of representatives were made in a very careful manner, as it is undoubtedly the most remarkable collection of letters ever made on the subject, including as it does the views of Hon. John D. Long, secretary of the navy, Admiral George Dewey, Rear Admiral W. T. Sampson, Rear Admiral W. S. Schley and Hon. D. B. Henderson, speaker of the house of representatives, as well as many other prominent citizens in all parts of the country. Communications are still being received at this office but they can not, of course, be included in the pamphlet.

The Washington correspondent of the Review says under date of Dec. 13: "There is scarcely a doubt that the shipping bill will be passed by both houses during the present session. Indeed Senator Hanna says that the only reason that it did not pass last year was owing to the lateness of its introduction. The bill has already been introduced in the house by Mr. Payne of New York and has been referred to the committee on merchant marine and fisheries. It will be introduced in the senate by Senator Frye, who would have introduced it last year had he not been unavoidably absent."

Two communications received at this office since the pamphlet above referred to has been printed are as follows:

FROM A CHICAGO ADMIRALTY LAWYER.

Editor Marine Review:—Our shipping certainly needs to be put upon an equal footing with foreign shipping, subsidized in like manner and amount as foreign ships are subsidized, because of the great benefit that would accrue to our country and the strength it would give our government. Other nations have seen the advantages in a large and well-equipped merchant marine, and have so skillfully taken advantage of us that we now find ourselves not only without a merchant marine but also compelled to pay foreign ship owners the enormous sum of about two hundred million dollars a year for carrying the product of our mines, mills and fields to foreign lands.

This sum, though large in itself, represents in a very insignificant way the actual benefits accruing to foreign countries and governments, for it means that millions of dollars are invested abroad in vessel property. It means that millions are spent by these ship owners in foreign countries for ship supplies. It means that millions are paid in wages each year to foreigners who man and officer these ships. It means that millions are paid each year to the owners of foreign ship yards, who in turn purchase all their supplies abroad. It means that in case of war, foreign countries will have an overwhelming number of good steel ships from which to organize an auxiliary navy, capable of attacking our transports, and fleet enough to run away from our battleships and cruisers.

Should we, on the other hand, build up a merchant marine of our own the result would be conversely favorable to us. We would not only save the two hundred million a year in freight, but our people would own the ships. Our people would build and supply them. Our countrymen would man and officer them. Our government would have a strong merchant marine from which to organize an auxiliary navy. Our ship yards would be running night and day. Our mines and mills would not be able to cope with the increased demands for ore, plates and machinery. Our farms and forests would likewise be called upon to supply the mills, the ship yards and the merchant marine. Our skilled labor would find new employment. Our hardy lake sailors thrown out of employment as the result of the displacement of sailing vessels by steaming vessels, would find new employment upon ships from their own land. The whole country would feel the pulse and throb of a re-invigorated merchant marine, and there is hardly a person in the country who would not feel a beneficial effect. That it may come quickly is the wish of

WM. E. STOWE.

806 Marquette building, Chicago.

IMPORTANCE OF THE SUBJECT TO THE PEOPLE OF THE SOUTH.

Editor Marine Review:—The many letters relating to the development of our merchant marine, which have of late appeared in your paper, have been extremely interesting, as giving the opinions held by influential persons in all parts of our country, as to the necessity of the government adopting measures to encourage the building and operating of vessels for the foreign trade; but there is one point which does not appear to have been sufficiently brought out, and that is the great importance of this subject to the people of the southern states.

The southern states produce the bulky article of export. Cotton and cotton goods, lumber, naval stores, phosphate rock, iron, coal and coke are products of the southern states, and grain and flour are largely exported from southern ports. There can be no question but that, in bulk and tonnage, the products of the southern states form a very large proportion of our foreign exports, and it is not too much to say that the business is at present done exclusively in foreign ships. At present there are no American ships engaged in foreign trade, sailing from southern ports. All the export trade from southern ports is in foreign ships, and practically all of the products of the south exported to foreign countries, whether from southern or northern ports, are shipped under foreign flags. The people of the southern states are vitally interested in the question of the building of American ships for the foreign trade, and their interest in the matter becomes more pronounced as the opportunities for the development of trade in the West Indies and South America, and in the far east are better understood.

F. J. KIMBALL.

Norfolk & Western Ry. Co., New York, Dec. 7, 1899.

REPAIRS TO A BROKEN SHAFT.

There is reproduced herewith two very interesting sketches illustrating repairs made at sea to a broken thrust shaft, and particulars regarding which were transmitted to the American Machinist by A. H. Nourse. Mr. Nourse says:

"I enclose a sketch, Fig. 1, of a thrust-shaft from a steamship, which was repaired as shown, with the ship at sea. The shaft was broken near

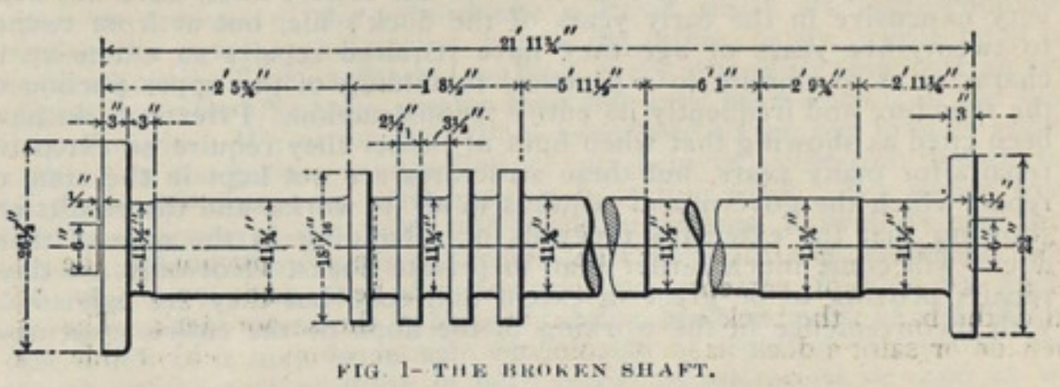


FIG. 1—THE BROKEN SHAFT.

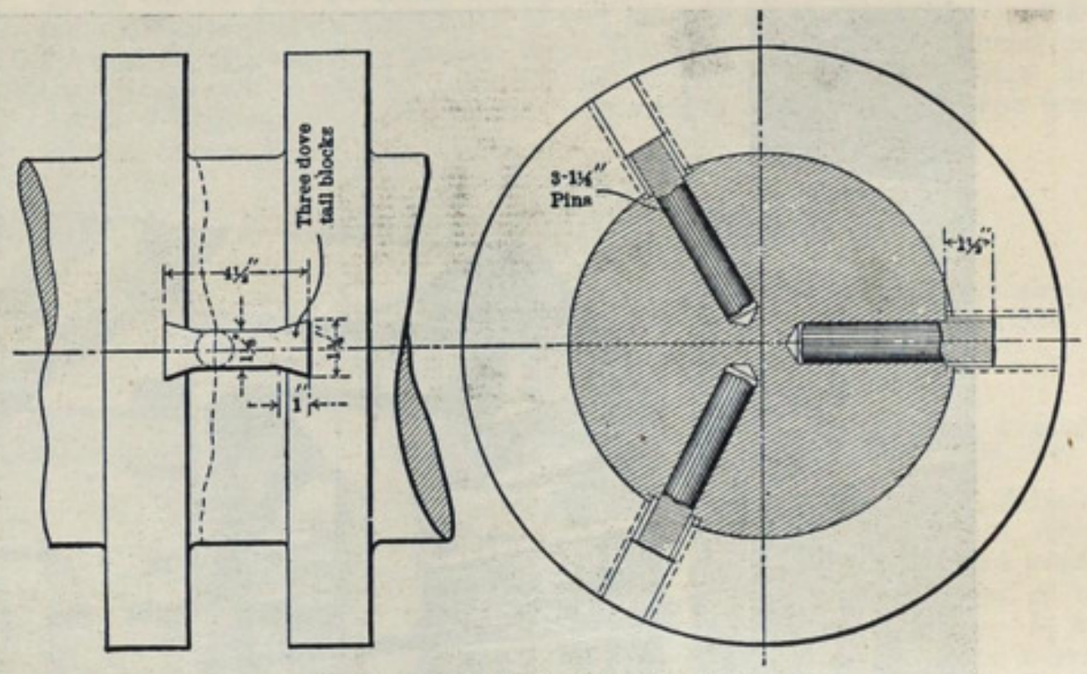


FIG. 2—REPAIRS TO A THRUST SHAFT.

the after collar, the break being indicated by the dotted line. The repairs were made at sea, as shown in Fig. 2, by three men in six days. The engine was of 1,100 horse-power capacity. After repairs were made the boat made a speed of 6 knots an hour, and ran 600 miles before reaching a harbor. When the shaft was taken from the ship it seemed to be perfectly solid, and there was no perceptible sag at the broken place."

SCARCITY OF SHIP BUILDING MATERIAL.

There seems to be some dispute as to the status of affairs regarding supplies of material among the ship builders engaged upon contracts for the United States navy department, more especially the contracts for torpedo craft. In reports sent out from Washington during the past week it was stated that builders of this class of vessel are greatly embarrassed for want of structural steel and that moreover the leading manufacturers could not give them assurances of a satisfactory kind regarding supplies for several months to come. As evidence, the fact was cited that one of the large manufacturing interests a few days ago notified the builders of torpedo boats at Baltimore that it would be impossible to furnish within the time specified the material now required for the construction of these vessels. Several additional requests for extension of time were made at the navy department last week. To all of these the answer is said to have been to the effect that the department has no power to make extensions and that firms must trust to congress to reimburse them for the penalties imposed. Naturally, should congress refuse to make good the deficiencies the loss to each builder will be considerable.

From one source, however, the reports sent out from Washington met with emphatic refutation. It was said that the Bethlehem Steel Co. of South Bethlehem, Pa., was among the manufacturers who recently sent out notices of inability to fill contracts for material, owing to short production of pig iron. Vice President Edward M. McIlvain of the Bethlehem company denounces this story as absurd. He says that his company has sent out no such notices, and if any of the ship builders have asked for time extensions it is assuredly not because of inability to secure the class of material furnished by the Bethlehem company.

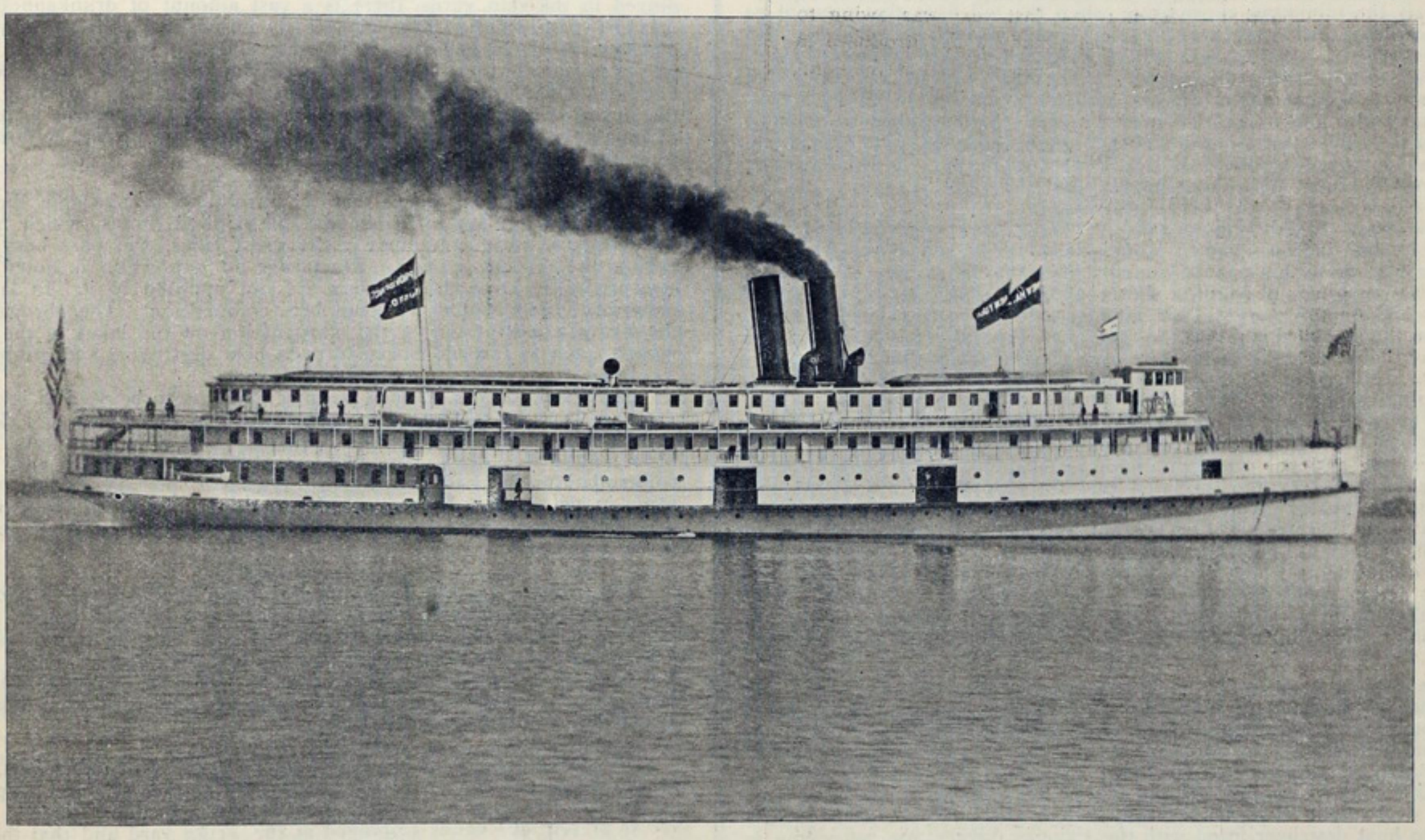
A committee has been formed in Holland under the patronage of the queen for the organization of a Dutch historical naval exhibition to occur at The Hague in the summer of 1900. Among the classes of objects to be exhibited will be portraits of naval heroes, paintings, engravings, autographs, logs, journals, lampoons, arms, etc. The committee announces that it will undertake to pay all charges of packing, forwarding, insurance, correspondence, etc., connected with the exhibition and that exhibitors do not incur any expense whatever. The committee will furthermore remain responsible for objects loaned from the time they are forwarded until they are back in the hands of the owners, who are requested to fix the amount for which they should be insured. F. R. Planten, consul general of the Netherlands at New York city, will undertake the forwarding of objects loaned for exhibition.

STEAMER CHESTER M. CHAPIN.

A MAGNIFICENT PASSENGER VESSEL JUST COMPLETED BY THE MARINE DEPARTMENT OF THE MARYLAND STEEL CO., SPARROW'S POINT, MD.

There is presented herewith a very excellent picture of the steamer Chester M. Chapin, recently completed by the Maryland Steel Co. of Sparrow's Point, Md., for the New Haven Steamboat Co. This handsome twin-screw passenger steamer, which has just reached New York city, is designed for service between New York and New Haven, Conn. She is a very trim looking craft and presents even more attractive lines than the steamer Richard Peck, after which she has been modeled by her designers, Cary, Smith & Barbey, naval architects of New York city. The Chapin is 324 feet on deck, 310 feet water line, 48 feet molded beam, 64 feet breadth over guards and 17 feet 2½ inches depth. She is calculated to maintain a speed of 21½ statute miles per hour, is 10 feet longer than the Peck and has cabins on the galley deck continued aft as they are forward on the Peck. She was built in accordance with rules of the United States Standard Register of Shipping. The lower deck has ten staterooms with accommodations for twenty officers; also some passenger accommodations and quarters in forcastle for a large part of the crew.

The main deck contains the ladies' cabin and in this portion of the vessel a marked improvement over the Peck has been made by the removal of the bar to the back of the dining room on the saloon deck. The promenade or saloon deck has a double row of staterooms on either side,



STEAMER CHESTER M. CHAPIN, RECENTLY COMPLETED BY THE MARYLAND STEEL CO., SPARROW'S POINT, MD.

and the gallery deck has the dining room, cafe, bar, kitchen, pantry, officers' rooms and mess. The hurricane deck is occupied by the pilot house and captain's room. Mahogany staircases are provided from the main to the lower deck and to the grand saloon. The steamer is provided with steam heat throughout, is fitted with two iron water tanks, each of a capacity of 2,000 gallons. Two Ideal inclined engines furnish power for the electric plant, which provides current to 650 sixteen-candle-power incandescent lamps and an 8,000 candle-power search light.

Power for driving the ship is furnished by two inverted, direct acting, surface condensing, triple expansion engines, with cylinders of 24, 38 and 60 inches diameter by 30 inches stroke. The high pressure cylinder is equipped with piston valves and the low pressure cylinders with slide valves. To these engines, which are expected to develop 4,200 indicated horse power, steam is supplied from six Scotch boilers, 13 feet in diameter by 11½ feet in length, at a working pressure of 160 pounds. The boilers have three steel corrugated furnaces, 400 square feet of grate surface and 12,000 square feet of heating furnace. The crank shaft is of the built-up type. The interior furnishings of the vessel are in almost every instance far more elaborate than those of the Richard Peck, and the equipment is of the very best, including a Williamson steam steerer with cylinder 6 by 6 inches, a windlass of the American Ship Windlass Co. type, Katzenstein packing and a full outfit of Blake duplex pumps. The Maryland company made every effort to carry out the idea of the designers to have the new steamer especially safe.

A. L. Jaynes of Buffalo, inventor of an ice crushing device, gravely announces that he will contest the contract made by the city of Buffalo for a new fire boat to be built by the Union Dry Dock Co. of Buffalo, at a cost of $91,000 and which was fully described and illustrated in the last issue of the Review. He claims that he did not receive fair treatment from the city officials when he offered to build a machine to break ice in the harbor at a cost of $65,000.

NAVAL ENGINEERS—PARIS CONGRESS.

At a recent meeting of the American Society of Naval Engineers, Washington, the following officers were placed in nomination for 1900. For president, Commander Harrie Webster and Lieut. Commander F. H. Bailey; for secretary-treasurer, Lieut. Commander A. B. Willits and Lieutenant W. W. White; for council (three to be elected) Lieut. Commander F. H. Bailey, Lieut. Commander W. H. Worthington, Lieut. R. S. Griffin, Lieut. B. C. Bryan, Lieut. C. A. E. King and Lieut. W. W. White. Separate voting slips will be mailed to each member of the organization and return envelopes will be enclosed. A second voting slip, which will be mailed at the same time, will be distributed for the purpose of gaining the opinion of members as to prize articles printed in the volume of the journal of the society just closed. In this connection the managers call attention to the fact that the offer of prizes does not seem to draw out the efforts intended or hoped for, and at the meeting to be held in January a proposition will be made to again change the article governing this feature so as to do away with the prize essays altogether and simply permit the purchase of such manuscripts as the council may find available and desirable at a fair current rate.

The society has been asked to lend its aid toward making successful the international congress of naval architects, which will be held under the patronage of the French government, in the Palace des Congress, of the exposition of 1900, and opening on July 19, for three days' continuance. This congress is of interest to engineers and constructors of ships, and of motor and mechanical apparatus of every kind employed in ships, to the manufacturers of material and objects of whatever kind that may be used either in naval construction or in yards and workshops, to sailors, ship owners and yachtsmen, and to anyone who is in any way concerned in the progress of maritime locomotion. All such persons are earnestly invited to help the congress with the fruit of their experience, investigations and studies. They can do this by presenting communications to be read and discussed during the sessions, by taking part in the discussions, or as listeners. The printed report of the communications and discussions will be presented to each of the active members of the congress. Correspondence is solicited from those who contemplate aiding with papers on any branch of the subjects to be discussed, which are: Naval architecture, geometry, and status of ship stability and general theories; hull construction; machinery construction; special types of vessels for particular service; heavy outfitting of dock yards, etc.; history and development of merchant, pleasure and war vessels, and including any relevant matter to marine progress or education in marine engineering. The secretary-general is Mr. Hauser, Ingenieur de la Marinè en retraite, 4 Rue Meissonnier, Paris, to whom further inquiries may be addressed.

There are now bound for Philadelphia, or under charter to sail for that place from various parts of the world, a total of thirty-four vessels laden with iron or manganese ores. This number is outside of those vessels which are bringing ore to Philadelphia regularly from Cuba and Newfoundland. It is estimated that the cargoes of the thirty-four vessels will aggregate fully 120,000 tons. Eighteen of the vessels are bringing manganese ore, about 65,000 tons, and the remainder carry 55,000 tons of iron ore. Twelve of the cargoes of iron ore are coming from Spain, three from the island of Elba and one from Russia.

Capt. Chester Harding, United States engineer at Grand Rapids, Mich., gives notice in an advertisement on page 25 of this issue that he will open proposals Jan. 13, 1900, for the construction of breakwaters at Michigan City, Ind.

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In a short communication to the New York Sun—only a couple of paragraphs—Mr. E. T. Chamberlain, United States commissioner of navigation, makes a pointed reply to criticism of the American shipping bill. The bill is undoubtedly open to attack as is any bill in congress assailing established interest. "But if there are any 'vested rights' in shipping in this country," says Mr. Chamberlain, "they are British-German steamship interests, which are naturally hostile to American competition with their lines. American newspapers, accordingly, should at least study the proposition in congress before unwittingly striking hands with European corporations which profit by existing conditions. It is not fair to say that the subsidy bill means an expenditure of $9,000,000 a month when, by its terms, that is the maximum expenditure a year, nor to say that $9,000,000 a year is the minimum expenditure when the bill fixes that amount as the maximum. All Americans favor an American merchant marine. No progress will be made toward getting it if careless and indifferent statements are to appear in print as facts. It would be a pleasure to show that the new expenditures under the bill cannot now exceed $3,000,000 a year, and that under the maximum fixed we shall compel European capitals to send their passengers and mails for Asiatic ports through New York. This fact is appreciated in London, Paris and Berlin. It will be better understood in New York if our people study the globe."

The ways of labor unions are certainly past understanding. No class of labor in this country would derive more advantage from the American shipping bill now before congress than the sailors. With them the advantage would be of a direct and immediate kind. On steam vessels and on tow barges (the latter especially) in the coasting trade, both on the seaboard and on the great lakes, the sailor has been replaced to a very large extent of late years by a class of labor that is not necessarily of a skilled kind. But on the ships to trade to all parts of the world, that would be built in event of the passage of the shipping bill, sailors would be required and in great numbers. Places would be found for the men whose calling has been lost in the decline of American shipping. And yet the national organization of seamen, in annual convention at Chicago a few days ago, declared that the shipping bill was "vicious, uncalled for and of no benefit to labor in this country." Certainly the leaders of the Seamen's Union are not informed as to the provisions of the bill, or they are acting blindly in opposition to the measure because of the inducements which it offers to the investment of capital. In view of this action, what consideration can the officers of this union expect when they go to congress with some of the radical measures adopted at the same convention in support of labor legislation which they propose.

Reports received by the navy department from Lieut. H. P. Norton, stationed in England as inspector of machinery of the cruiser Albany now building at the Elswick yard of Armstrong, Mitchell & Co., indicate that that officer is by no means enthusiastic over the turbine-propelled type of vessel as thus far developed. He says the Turbinia is not a success so far as weights go and that when first launched she was so much overweight as to be seriously out of trim. The Viper, the new torpedo boat destroyer fitted with the Parsons turbine, has, according to Lieut. Norton's views, much better lines and the weights are far less. The turbines in the Turbinia, the American officer says, are placed very low, and all the heat being below the platforms makes the engine room very uncomfortable. He seems to think that a considerable portion of the success of the Turbinia is due to the fact that she has a boiler which can furnish all the steam that the turbine can use, and he is inclined to the opinion that nearly as good results have been obtained with the same boiler and a well balanced reciprocating engine.

William Fletcher of Norfolk, Va., is authority for an interesting story relative to the manner in which Mr. Collis P. Huntington recently averted a strike at his large ship yard at Newport News. According to the story, Mr. Huntington, when the strike was threatened, sent for the heads of departments and asked them to pick out a delegation that would include honest, fair-minded workmen from all parts of the establishment. When this delegation had assembled, Mr. Huntington told them that it was possible they were not receiving fair wages and he wanted them to settle the question to their own satisfaction by visiting all the principal ship building plants on the Delaware river. When the men came back from their semi-official journey they told the managers of the Newport News yard that they were satisfied that their wages were fully equal to what was being paid at any of the other Atlantic coast works, and that their surroundings were far more pleasant than those of the men in many of the ship yards which they had visited.

A coveted mark, 25,000,000 net tons, has undoubtedly been reached in the commerce passing to and from Lake Superior through the canals at the Sault during the season of lake navigation now at an end. A few straggling cargoes are yet to pass the canals and the final figures can not therefore be given, but it is certain that the number of tons of freight is full twenty-five millions, as official reports up to Dec. 1 showed 24,636,533 tons of freight and 21,527,420 registered tons, with 19,740 vessel passages. In the full season of 1898 the figures were: Total freight tons, 21,234,664; total registered tons, 18,622,754; total vessel passages, 17,761. It will thus be seen that the commerce of Lake Superior for the present season, approximately 25,000,000 tons, is about 4,000,000 tons in excess of last year. It is unfortunate that reliable statistics of the kind obtained at the Sault are not to be had for the great volume of commerce between important points below Lake Superior. The aggregate for the entire lake system would certainly reach 55,000,000 tons.

Works of the Charles Reeder Ship & Engine Building Co., one of the oldest concerns of its kind in Baltimore, have been closed and 130 men thrown out of work. The cause is announced as "repairs and other personal reasons." It is understood that there has existed for some time among officers of the company a difference of opinion as to the policy to be followed in the conduct of the business. It is hoped that the works will shortly be able to resume operations, although the renewal will probably be on a smaller scale, inasmuch as considerable machinery has already been removed. The most recent work of the Reeder company was the construction of the very handsome steamer Queen Anne, which was a short time ago turned over to the Queen Anne Railroad Co. Messrs. Charles Reeder, Charles M. Reeder, Jr., and Oliver Reeder are principals in the company.

Mr. A. Robinson of Glasgow, Scotland, who is now in this country, in comparing the state of the ship building industry here and abroad said: "Since coming to the United States I have noticed one thing that is greatly to the credit of your country, and that is the good behavior of your working class. In Glasgow, where thousands of men are employed in the ship yards, there is a vast amount of drunkenness. The men are paid on Saturday, get beastly intoxicated Sunday, stay drunk Monday, are in a half stupor Tuesday and start in Wednesday in bad plight to resume their tasks. Thursday and Friday they do excellently, but relax their efforts Saturday in anticipation of the cash that affords the means of another debauch. This is not an overdrawn picture and although, of course, it is not true of all the wage earners it does apply to a large percentage of them."

There is every prospect that the resolution to abrogate the treaty of 1817 between Great Britain and the United States, which prevents the construction of warships on the great lakes, will pass both houses during the present session. Practically no opposition is noted to the measure. The coastwise builders are not opposed to it. In fact it is understood they would welcome lake competition. The abrogation of the treaty would permit of the construction on the lakes of the lighter vessels, such as torpedo boats, torpedo boat destroyers and gunboats.

The Cecil Rhodes, a small steamer which is to be used in laying the wires of the Cape-to-Cairo telegraph line along the shores of Lake Tanganyika, has been launched in England. She is 80 feet long, 14 feet beam and 7 feet deep. She will carry 40 tons of freight and has accommodations for four passengers. Owing to portages which must be made in getting the boat to its destination it has been constructed in detachable sections and can be done up, machinery and all, in forty-pound packages.

Capt. Kaempff of the Hamburg-American liner Auguste Victoria has just completed his one-hundredth round trip across the Atlantic. During long service as a commander he has met with but one serious accident. This was a fire, which started in the hold of the steamer Gellert during a voyage from Hamburg to New York in 1893. In the same year Capt. Kaempff towed the disabled steamer Italia to New York, receiving therefor salvage amounting to $25,000.

Mr. William R. Trigg of the Trigg company, Richmond, Va., grows more enthusiastic daily over the possibilities of that city as a ship building center. He says it will ultimately become a second Glasgow. There are at present 600 hands employed at the Trigg yard and that the number will be more than doubled within a year. Richmond business interests will bend every effort to securing the $3,500,000 recommended by the governmental engineers for the deepening of the James river.

The passage by the German reichstag during the past week of a measure authorizing a large increase of the navy will not be without effect on other maritime nations. It is understood that an extensive works to be engaged in the construction of naval vessels will be erected at Emden.

CHARTS OF THE PHILIPPINES, CUBA, ETC.

Capt. J. E. Craig, hydrographer, navy department, says in his annual report:

"The extraordinary demands made upon the resources of the hydrographic office, caused by the war, have been somewhat relaxed, and the issues of outfits of charts and publications to vessels of the navy have decreased in number from those of the preceding year; but there is left a permanently increased demand on the work of the office far beyond that of the times before the war. The hydrographic information received from naval vessels in the Philippine islands, reporting numerous errors in the charts of those regions, shows the necessity for thoroughly executed hydrographic surveys of those waters, and it is recommended that such surveys by the navy be made. For insuring safe navigation to our vessels that are required to visit all parts of the archipelago, trustworthy charts should be furnished as soon as practicable. The best charts attainable from the data extant are now supplied, but without new surveys they can not be made satisfactory. The charts of the coasts and harbors of Cuba and Porto Rico are very defective. It is recommended that the prosecution of the surveys in those waters continue uninterruptedly and vigorously until completely covered by trustworthy charts. There is also need, and it is recommended, of a thorough survey of the islands and shoals extending to the westward of the principal islands of Hawaii and forming part of the Hawaiian group, as possessions of the United States."

AMERICA'S SHIPPING BILL.

ARGUMENTS THAT ACCOMPANY THE BILL AND WHICH ARE MADE A PART OF IT AS INTRODUCED IN THE FIFTY-SIXTH CONGRESS.

The fundamental and principal reason and purpose of the United States aiding and encouraging our own shipping—helping to create it when it does not exist to the extent necessary to the defence and advancement of our just interests—and promoting its capacity to carry our surplus productions of every kind to the countries and peoples that need or wish them, as well as to add to the strength of the nation in times (often coming suddenly) when our power and immediate means of self-defence may be taxed to the utmost, are stated in the title of the bill—to promote the commerce and increase the foreign trade of the United States and to provide auxiliary cruisers, transports, and seamen for government use when necessary. If this title or the preamble is true, the necessity for legislation of this character is demonstrated, unless it be shown that our present condition is due to the fault of American ship builders and ship owners, or to the paying of too high wages by manufacturers and others employing the labor of our people. It will scarcely be pretended that either of these alternatives exists. The condition of our commerce during many years is shown in the very instructive reports of the commissioner of navigation for 1897, 1898 and 1899, and also in the reports of the secretary of the treasury for 1898 and 1899.

From these reports and other government documents it definitely appears (a state of things long well known in all the productive and business circles of the country) that our exports have not kept pace with the increase of our population, or with the increase of our productive resources and power in producing food and food products, and in the production of manufacturing industries of all kinds which convert the raw material of our country into higher and more valuable forms, and thus find a necessary field of employment for the intelligence, scientific and mechanical skill and enterprise of our citizens. The larger this field is, the greater is the capacity of our citizens to utilize and enjoy the products of the farm and the shop, and thereby to enlarge and make profitable the home markets as well as the foreign ones for everything that is produced or manufactured. It scarcely need be said that the home market is one of the principal and great essentials to the prosperity of any nation which possesses the abundant and almost universal natural resources of those possessed by the United States. It means the co-operation and mutual assistance of all the people in the development and increase of all their industrial energies. The full fruit of this development and increase must be found in our increasing our exportations of all our products and manufactures to every part of the globe where purchasers of them can be found. Such has been the wise and profitable policy of all the nations possessing in any considerable degree the natural or artificial resources necessary to these ends. Such nations have done this steadily and persistently, and have by subsidies and other aids to their commercial and shipping interests, such as exploiting corporations for foreign trade, and by trading posts, banking facilities, etc., obtained great advantages over the producers, manufacturers, and the shipping interests of the United States. It is an obvious truth that the volume of the foreign trade of any nation is very largely influenced and increased by the fact that its own ships are the means of its communication and trade. Their influence on all the agencies of such a trade is naturally and properly directed to the development and increase of the trade of their own country. And so, while the United States have slept and been indifferent to these considerations, the trade with and markets of most of the nations using such things as the producing and manufacturing nations have to sell have fallen to and been absorbed by others than the United States. The great bulk of our export trade must depend upon shipping. No theory or doctrine of protection or free trade, no theory or doctrine of finance or currency, can affect the fact that our only means of communication and intercourse with more than 90 per cent of all the inhabitants of the globe is shipping. In order that the United States can fairly compete with other nations in the markets beyond the seas, it is essential that our means of communication and intercourse with the buying nations should be put under the protection of our own flag and on a footing of equality, at least, with our competitors. In the present condition of national affairs and trade in those parts of the globe where perhaps the largest opening for the trade of ourselves and our competitors will exist in the future, the most efficacious means to these ends must be adopted.

It is an unpleasant fact that at the present time more than 85 per cent of the foreign commerce of the United States is conducted by means of foreign ships, and not only with the countries under whose flag such ships sail, but with other countries having little or no ocean marine, the result of which is, as above suggested, that there is a constant, powerful, and successful influence exerted in favor of the productions and manufactures of the country whose flag is borne by the trading ship and by all the accessories of government aids and of mercantile and financial influences in the ports and countries to which such ships go. If we are not speedily to endeavor, by every just means, to obtain a fair and equal footing in the foreign markets referred to, and not to abandon them to our competitors, whose wise and just policy for their own good maintains at every cost necessary to success their shipping intercourse and the facilities and aids that necessarily flow from it, we must speedily adopt a corresponding policy, and by the most liberal inducements rehabilitate our merchant marine, and try, by every fair means, to regain the position we once occupied and which we ought to occupy in the future. Such a course of policy does not chiefly rest under the idea of helping the ship building and ship sailing interests of the United States on their own account, but upon the element—common to all our productive and manufacturing industries—of their being one of the essential cooperating means of general prosperity and welfare. The main thing is to enable the producing and all other industries of the United States to regain our just position in the markets of the world. There is no honest and industrious worker in the manifold fields of labor in the United States who is not concerned in such an undertaking. That American natural resources, capacity, and enterprise can not be excelled by those of the people of any other country may be asserted without presumption. And yet, in the face of this, the foreign commerce conducted by our own shipping has decreased from 80 per cent in 1846 and 66 per cent in 1860 to 11 per cent in 1897. Other manufacturing nations, influenced by the considerations before stated, have aided in ship building and in establishing and supporting lines of sea connection under their own flags with distant countries, and have thereby enabled their own citizens to establish trading houses, banking houses, and other facilities for the sale of their productions in those countries; and they have thus, in a very large degree, secured a comparatively exclusive market for their own goods. Besides this, the cost of their shipping, owing to prices of labor, and so forth, being generally lower than those paid in the United States, has been considerably and sometimes very much less than that of ships built in the United States.

The result of all these circumstances has been to deprive the United States of the supremacy, or at least the equality in foreign trade, which it had in earlier days, and to very greatly retard the sale of American goods in these far-away countries in which the products of the industry of the United States ought to have an equal opportunity for disposition. It may well be repeated in this connection that by just so much as the export trade of the United States is increased will the industries and labors of our own people be benefited. To regain a trade once lost or greatly curtailed requires extraordinary and persistent effort and expense. Once regained, it can support itself under equal conditions.

It is a well-known fact that the largest markets of the world not already well developed are to be sought for and found in eastern Asia. These markets are convenient of access from our Pacific coast, and will be almost equally so from our Atlantic coast when the canal crossing the Isthmus of Nicaragua shall have been built under the auspices of the United States. It is obvious that the struggle of certain nations for political and military supremacy and spheres of influence in eastern Asia, as well as in Africa, has been, and is, with perhaps a single exception, founded upon a desire to obtain a dominating influence over the markets of those regions. In the commerce of those markets the United States ought to have a fair opportunity to compete. This cannot be effectively obtained without our own ships and our own flag. The sooner adequate provision is made to this end the less will be the difficulty and the greater will be our reward. To attain these objects no expense to the common treasury in aid of ship building and ship trading can be too great, for the trade, once established, will be permanent; unaided now, it will be lost for a long future. In view of our existing treaty relations with other countries, it is manifest that the ends before referred to can only be presently and effectively attained by the enactment of a law giving direct aid and encouragement to the increase of our merchant marine and to the establishment of American lines of communication and trade with foreign markets, and especially with those above referred to. The substance of the proposed bill may be stated as follows:

I. In order to obtain the earliest possible action pursuant to the policy of the United States above referred to, the bill provides for bringing under our flag and the protection of our laws the few foreign built ships now actually owned and contracted for by American citizens, and in which and in their trade American capital has been and is actually invested. These ships have been built and their trade established under a foreign flag, because the ships could not be built and fitted out here and operated at a cost that would enable them successfully to compete with the ships and trade of foreigners, aided as they have been, are, and will continue to be in various ways, by their own governments.

II. The American registry of these foreign-built ships is conditioned upon their owners building here and putting into our own trade at the earliest practicable time new vessels of a tonnage fairly proportionate to that of the admitted ships.

III. None of these foreign-built ships, or of the new ships so to be built here, are permitted to engage in our coasting trade; but they are permitted to engage in trade with such other ports belonging to the United States as ships under foreign flags are permitted to trade with.

IV. All the owners of American trading ships now existing are required to undertake the construction of new tonnage fairly proportioned to that of the ships claiming the benefit of this act.

V. All these ships are required to carry the mails of the United States free of charge.

VI. All the new ships must be built so as to be readily converted into cruisers or other auxiliary aids to the military power of the United States whenever needed for such purposes.

VII. When needed, they can be taken or employed by the United States at any time.

VIII. All these ships are bound (in addition to the indispensable training of their crews) to constantly educate and train American boys for the various necessities of naval operations.

IX. All the foregoing mentioned conditions and requirements being complied with, American vessels are to be aided and assisted in regaining and increasing our trade to distant ports by a compensation graduated (with one exception) upon the distance sailed and upon the size and speed of the ships.

X. The exception referred to in the last paragraph applies to sailing vessels and to slow steamships, the maintenance of which is also essential to our maritime progress and prosperity, and also to the strength of our military power.

XI. Vessels engaged in the deep-sea fisheries are also provided for upon the same policy of supplying to the United States a body of intelligent and experienced American mariners at all times, ready to serve our country when needed.

XII. The respective compensations arranged in the bill have been computed, it is believed, upon the lowest basis consistent with the attainment of the great and urgent objects already stated, and the aggregate compensation is limited to a sum not exceeding $9,000,000 a year.

The foregoing paragraphs present the scheme and main points of the bill. The other provisions are incidental and of detail. The provisions of the bill are believed to be in harmony with the last annual message of the president of the United States and with the recommendations of the secretary of the treasury, the postmaster-general, and the commissioner of navigation, and, it is hoped, will commend themselves to the patriotic judgment of congress.

INCREASING OUR FIGHTING STRENGTH.

THE YEAR 1900 WILL BREAK ALL RECORDS FOR THE NUMBER OF NEW SHIPS ADDED TO THE NAVY—FIVE POWERFUL BATTLESHIPS, ONE CRUISER AND NUMEROUS TORPEDO CRAFT WILL BE COMPLETED—GENERAL WASHINGTON NEWS.

WASHINGTON OFFICE MARINE REVIEW, 1345 PENNSYLVANIA AVE. } WASHINGTON, D. C., Dec. 13, 1899. }

As already outlined in the Review, the year 1900 will break all previous records for the number of new ships of various types added to the navy. But for the delays in the construction of the destroyers—the 30-knot vessels—and the torpedo boats of less speed, the increase of naval strength in 1900 would be of still greater proportions. Five of the most powerful battleships yet undertaken will be ready for commission during the year, and if the crews can possibly be obtained all will see active service before the early autumn. These vessels will materially increase the fighting strength of the service and will give to the home station a more powerful aggregation of heavy ships than was ever assembled under the American flag. In this class will be the Kearsarge and Kentucky, sister vessels, and the product of the Newport News works. Each has had most successful official trial trips within the past few weeks and both have shown that in speed and efficiency they outclass the Oregon and Iowa class. No vessels in any navy approximate these two ships in battery, power and arrangement of the heavier guns in the superimposed turrets fore and aft. While regarded as an experiment, able ordnance officers have given their unqualified approval of the system.

Equally powerful, but having a different battery, is the Alabama, building at Cramps, and expected to be ready for acceptance early in February. Capt. Brownson, who is to command this ship, speaks of it in terms of praise and predicts a fine record for it. Later in the year the Illinois and Wisconsin will be a part of the fighting strength, the former being due for commission in October and the latter on May 1 next. The Union Iron works, which has constructed some of the finest of the ships, including the Oregon and Olympia, are builders of the Wisconsin, while the Newport News company has the Illinois on hand. The delay in completing the latter has been due to the immense amount of government work on hand at that yard, which now includes three battleships and one monitor.

Next in point of size among vessels to be completed during the coming year will be the English-built cruiser Albany, now so far advanced that she should sail for New York to take her crew on board next month. Then come the torpedo craft Bainbridge, Chauncey and Barry, building at Philadelphia, and which are due in August; the Dale and Decatur, building at Richmond, in November; the Hopkins and Hull at Wilmington, in December; the Lawrence and Macdonough at Weymouth, Mass., in June or July, and the Paul Jones at San Francisco, about the same time. The Truxton, Whipple and Worden, building at Sparrow's Point, are in doubt, but will probably not be finished until early in 1901. The Bailey, Goldsborough, Bagley, Burney, Blakely, Biddle, De Long, Nicholson, O'Brien, Shubrick, Stockton, Thornton, Tingey and Wilkes should also, according to reports, be a part of the service during the next year.

Representative Underwood of Alabama, will renew in the present congress his fight to secure the erection by the government of an armor plate factory. He has already introduced a bill for that purpose, which will be considered by the committee on naval affairs. In view of the proposed increase of ships for the navy and the large amount of armor plate to be used by the government it is said to be not improbable that the Underwood bill will claim the early attention of congress. In this connection it is well to note that the secretary of the navy has transmitted to the senate the report by Read Admiral O'Neil upon the subject of armor plate for naval vessels. As already foreshadowed in the Review, it goes into the subject of the manufacture of armor plate in great detail and concludes by recommending that the restriction of price be removed. If this restriction is not removed it will be impossible to continue the construction of modern naval vessels. As to the establishment of a government armor plate factory, it is asserted that owing to the increase in the price of materials, it is necessary to add 30 per cent. to the estimate of $3,000,000 heretofore made regarding the cost of such plant.

Secretary Long's recommendation in his annual report for the consolidation of the bureaus of construction, steam engineering and equipment will doubtless be carried through. Rear Admiral Hichborn will become the head of the consolidated bureaus. There has been under the present system of independent bureaus a great deal of friction. Every department wanted as much of the ship's space as it could possibly get and was forever warring for it. "The independent system," said Admiral Hichborn in discussing the subject, "was all very well when the department was only building a few boats, but now we are building some fifty and several of them are battleships. No private concern could exist under the system which has obtained in the navy department. There must be one head in control and every department must work in harmony with him. I venture to say that with all his immense navy, Chief Constructor White of the British navy does not work as long as I do. But he knows what's going on and he knows that his plans are being followed out to the letter. He is in control."

Three new warships with strictly Spanish names have now been added to the active service of the navy and commanding officers assigned them for duty with the Manila fleet. All of them were sunk in the battle of Manila, then raised, taken to Hong Kong and overhauled at great expense. The money, however, is said to be well expended. The cruisers are the Isla de Cuba, Isla de Luzon and Don Juan de Austria. Defects and errors in the original designs were corrected by Constructors Hobson and Capps. The value of the vessels, exclusive of armament, is estimated to be $610,000 and the total cost of raising and repairing them reached $305,000, so that the government effected a saving of 50 per cent of the value of the vessels. These ships are very small and it is doubtful if they will be allowed to cross the Pacific. They will very probably be permanently assigned to the Asiatic squadron.

BUILDING A GREAT NAVY.

IF CONGRESS ADOPTS SECRETARY LONG'S RECOMMENDATION FOR EIGHTEEN MORE VESSELS, OUR NAVY WILL BE INCREASED BY SEVENTY-NINE VESSELS WITHIN THE NEXT THREE YEARS—ELEVEN OF THEM BATTLESHIPS.

If the present congress adopts the recommendation of Secretary Long of the navy for eighteen more vessels of war, our naval fleet, compared with what it is today, will be increased to the extent of seventy-nine new vessels of all kinds. This increase includes the battleships Kearsarge and Kentucky, as well as two or three of the torpedo craft that are, alike to the Kearsarge and Kentucky, practically completed. It includes also the three battleships and three armored cruisers, authorized by the last congress, but delayed on account of the limit of $300 a ton placed on armor; and also the gunboat that is to replace the Michigan on the great lakes, but which is delayed awaiting modifications of the treaty with Great Britain relative to the construction of war vessels on the lakes. Thus it may be said that if congress agrees to the construction of the eighteen new vessels now asked for, the additions to the fleet now in commission that will be made within the next three years, most of them in 1900 and 1901, will be as follows:

Battleships, all of first class	11
Monitors	4
Armored cruisers	6
Protected cruisers	3
Unprotected cruisers	7
Gunboats	13
Torpedo craft	33
Practice ships	1
Submarine boat	1
Total	79

The list of vessels actually under contract at the present time, with names of builders and probable dates of completion, is as follows:

Name of vessel.	Where and by whom building.	Probable date of Completion.
BATTLE-SHIPS.		
*Kearsarge	Newport News Works, Newport News, Va.	Jan. 1900.
*Kentucky	Newport News Works, Newport News, Va.	Feb. 1900.
Illinois	Newport News Works, Newport News, Va.	Oct., 1900.
Alabama	Cramp & Sons, Philadelphia.	Feb., 1900.
Wisconsin	Union Iron Works, San Francisco.	May, 1900.
Maine	Cramp & Sons, Philadelphia.	June, 1901.
Missouri	Newport News Works, Newport News, Va.	Feb. 1902.
Ohio	Union Iron Works, San Francisco.	March, 1902.
MONITORS.		
Arkansas	Newport News Works, Newport News, Va.	Sept. 1901.
Connecticut	Bath Iron Works, Bath, Me.	March, 1901.
Florida	Lewis Nixon, Elizabeth, N. J.	April, 1901.
Wyoming	Union Iron Works, San Francisco.	March, 1901.
CRUISERS.		
Albany	Armstrong's, Newcastle, Eng.	Jan. 1900.
Denver	Neafie & Levy, Philadelphia.	July, 1902.
Galveston	Wm. R. Trigg, Richmond.	Jan., 1902.
Chattanooga	Lewis Nixon, Elizabethport, N. J.	July, 1902.
Cleveland	Bath Iron Works, Bath, Me.	July, 1902.
Tacoma	Union Iron Works, San Francisco.	April, 1902.
Desmoines	Fore River Co., Weymouth, Mass.	July, 1902.
PRACTICE SHIP.		
*Chesapeake	Bath Iron Works, Bath, Me.	Jan., 1900.
TORPEDO CRAFT.		
Bainbridge	Neafie & Levy, Philadelphia	Dec., 1900.
Barry	Neafie & Levy, Philadelphia.	Dec., 1900.
Chauncey	Neafie & Levy, Philadelphia.	Dec., 1900.
Dale	Wm. R. Trigg, Richmond.	Nov., 1900.
Decatur	Wm. R. Trigg, Richmond.	Nov., 1900.
Hopkins	Harlan & Hollingsworth, Wilmington, Del.	Jan., 1901,
Hull	Harlan & Hollingsworth. Wilmington, Del.	Jan., 1901.
Lawrence	Fore River Co., Weymouth, Mass.	June, 1900.
Macdonough	Fore River Co., Weymouth, Mass.	July, 1900.
Paul Jones	Union Iron Works, San Francisco.	August, 1900.
Perry	Union Iron Works, San Francisco.	August, 1900.
Preble	Union Iron Works, San Francisco.	August, 1900.
Stewart	Gas Engine & Power Co., Morris Heights, N.Y.	In doubt.
Truxton	Maryland Steel Co., Sparrow's Point, Md.	In doubt.
Whipple	Maryland Steel Co, Sparrow's Point, Md.	In doubt.
Worden	Maryland Steel Co., Sparrow's Point, Md.	In doubt.
*Dahlgren	Bath Iron Works, Bath, Me.	Dec., 1899.
*T. A. M. Craven	Bath Iron Works, Bath, Me.	Dec., 1899.
Bailey	Gas Engine & Power Co., Morris Heights, N.Y.	July, 1900.
Goldsborough	Wolff & Zwicker, Portland, Ore.	April, 1900.
Stringham	Harlan & Hollingsworth, Wilmington, Del.	April, 1900.
Bagley	Bath Iron Works, Bath, Me.	Nov., 1900.
Barney	Bath Iron Works, Bath, Me.	Nov., 1900.
Biddle	Bath Iron Works, Bath, Me.	Nov., 1900.
Blakely	Geo. Lawley & Son., S. Boston.	April, 1900.
Delong	Geo. Lawley & Son. S. Boston.	April, 1900.
Nicholson	Lewis Nixon, Elizabeth, N. J.	July, 1900.
O'Brien	Lewis Nixon, Elizabeth N. J.	July, 1900.
Shubrick	Wm. R. Trigg, Richmond.	April, 1900.
Stockton	Wm. R. Trigg, Richmond.	April, 1900.
Thornton	Wm. R. Trigg, Richmond.	April, 1900.
Tingey	Columbian Iron Works, Baltimore.	August, 1900.
Wilkes	Gas Engine & Power Co., Morris Heights, N.Y.	October, 1900.
SUBMARINE BOAT.		
Plunger	Columbia Iron Works, Baltimore.	In doubt.

*Vessels completed; practically ready for service.

The Pennsylvania Steel Co. has secured a contract from the Cuba Steel Ore Co. for the erection of a steel pier in Cuba. The pier will be 1,000 feet in length.

ANOTHER SAULT RIVER AFFAIR.

Editor Marine Review:—The two bad disasters happening in the Sault river this season and the subsequent effective bottling up of navigation, leads me to submit to you some correspondence from the masters of our steamer P. P. Pratt and consort Athens. This pair of boats left Ashtabula Nov. 4 laden with coal for Duluth, the Pratt drawing 16 feet of water forward and 17 feet aft; the Athens drawing 16 feet of water forward and aft. As there seems to be a feeling that steamers towing barges are responsible for a great deal of delay to the very fast lone steamers, I would suggest that some new rules be formulated for all river navigation on the Great Lakes, compelling a steamer with tow, upon being notified that a lone steamer is coming, to tie up or anchor at the first available spot until such time as the lone steamer or steamers pass. By this means both steamers could have the entire channel to share with boats proceeding in the opposite direction. Reports from the captains of the Pratt and Athens may possibly be classed in order of "what might have been," but it is a matter, nevertheless, that should be investigated. The rules are plain about passing in narrow channels, and if the master of the Parks Foster is not conversant with them, his place is not on a boat trading through the "Soo" river. WM. H. MACK.

Cleveland, Dec. 11, 1899.

The first letter in the correspondence above referred to is from Capt. Wm. Smith of the steamer Pratt, who says: "About 4 o'clock in the morning of Nov. 8, while going up the Sault river, we had a very lucky escape from a disaster which would very probably have again blocked navigation in that river. We passed the steamer Parks Foster lying at anchor in Little Mud lake. As we came along she fell in behind our barge, the Athens, coming at full speed and blowing us a one-whistle passing signal. I at once replied with a danger signal, following it with three whistles to check down. She did not respond to my signals, but kept on at full speed. I checked my speed, as the Foster was then alongside the Athens, and we were within 1,500 feet of the turn at Harwood's point. The Athens at once took a sheer, and believing she would go on the bottom in spite of anything we might do, but still anxious to avoid trouble, I rang up my steamer full speed and was fortunate enough to stop the barge's sheer and get her straightened up the channel. The captain of the Foster, seeing that our barge was headed for the port bank, stopped his steamer and fell in astern of us, passing us in Hay lake. On leaving below we had a new 10-inch tow line, and had shortened the tow line in Mud lake to about 700 feet. It is due to this line and to good steering on the Athens that she did not go on the bottom."

A letter from the captain of the Athens, Geo. Mackie, corroborates what is said in the report of the master of the steamboat, and adds that the captain of the Pratt not only blew danger signals but used a megaphone in warning the Foster of the risk that would be taken in trying to pass. The Athens did not strike bottom but the captain complains of the loss of the new 10-inch line.

BABCOCK & WILCOX BOILERS.

The Babcock & Wilcox Co. of England recently secured another good-sized order for water tube boilers from the firm of Thomas Wilson, Sons & Co. of Hull. The order is to fit the large passenger steamer Martello, plying between Hull and the ports of Boston and New York, with four of the largest size marine type of water tube boilers. The significance of this new order will be appreciated when it is stated that the same firm had previously fitted eight of their steamers with this type of boiler, commencing with the Nero in 1892 and ending with the Tasso at the beginning of the present year. The result of experience with boilers of this type on these vessels during the seven years has been such that the firm has now decided to place Babcock & Wilcox boilers on their larger vessels running to America. It is understood that the Babcock & Wilcox Co. has secured from the British admiralty an order to furnish boilers for the Espiegle. This would seem to indicate that the admiralty has been favorably impressed with the showing made by the boilers of the Sheldrake. During the past month orders have been booked for fifteen boilers of this type for sand pumping dredgers for the government of Queensland, New South Wales and India, and boilers for two vessels for the Odessa service now being built at the yard of John Cockerill, Hoboken. The dredgers are being built at the Armstrong Works, Newcastle, England.

PATENTS ON PNEUMATIC TOOLS

Editor Marine Review:—We notice in recent issues of trade journals reference to a circular issued jointly by two manufacturers of pneumatic tools, in which they state that the patents controlled by them cover the fundamental principles of pneumatic hammers, without the combined use of which no successful pneumatic hammers can be made. We do not, at this writing, desire to express an opinion as to the accuracy of this statement when applied to valved hammers, but it is absolutely misleading and damaging to our interests in its present form. We trust you will give this letter at least equal prominence to the statements made as above, and allow us to state that the valveless hammers manufactured by us are not in any way an infringement of the patents they refer to or any others, and that the question of their success is one that is settled by their use and not by statements of other competing manufacturers.

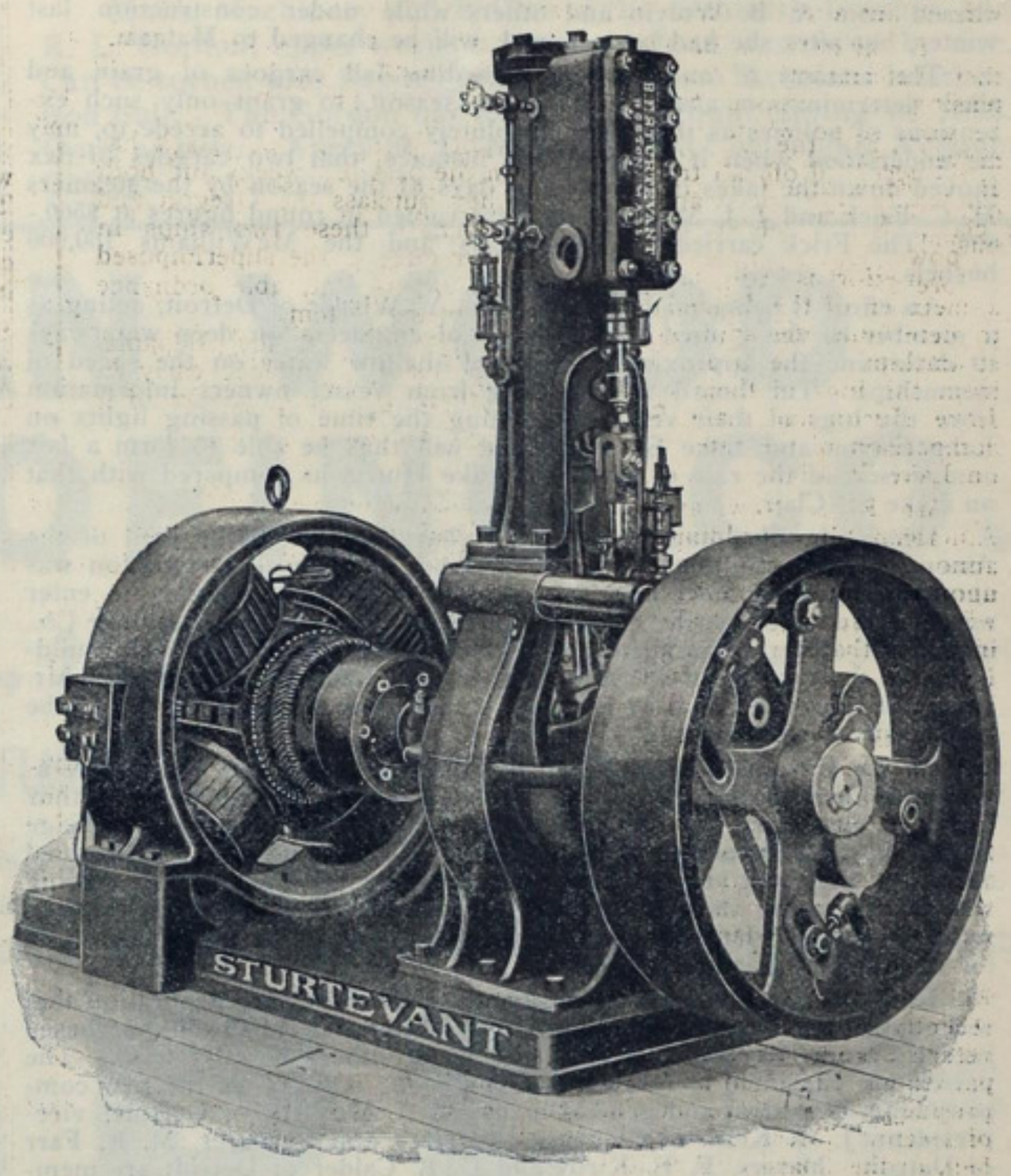
Chicago, Nov. 11, 1899. THE Q. & C. COMPANY.

Capt. P. J. O'Reilly, inspector for the New Orleans board of underwriters, has a job of considerable importance to look after in the sinking of the steamer Natchez, which occurred a few days ago near Natchez, Miss. The steamer was valued at probably $50,000 and her cargo of cotton and cotton seed was also quite valuable. She was released without great difficulty. Insurance interests in the Mississippi are fully alive to the importance of immediate action following accidents of this kind. Within a few hours after the Natchez was sunk there were five divers on the scene ready to begin work on her.

A STURTEVANT GENERATING SET.

A form of generating set built in small sizes for general purposes is illustrated herewith, as designed and constructed by the B. F. Sturtevant Co. of Boston, Mass. These sizes range from a set consisting of a 4x4 engine with a generator, having an output of 3,000 Watts and a combined weight with the engine of 1,400 pounds, up to a 7x7 engine with a generator output of 10,000 Watts and a combined weight of 4,375 pounds. The engines of this series are designed for operation at 90 pounds steam pressure or under. A second series ranging from 6x4 engine to a 13x7 engine is built for much lower pressures.

The engine frame in the larger sizes is built in two parts as shown. In the smaller sizes it is cast in one piece. In both cases the valve is of the balanced piston type, and receives its motion through a rocker from a single eccentric, so pivoted to the governor wheel that a change in the position of the governor weight causes it to swing across the shaft. This movement changes the travel of the valve, and regulates the points of



cut off and compression, the former between 0 and ⅞ of the stroke. The perfect balance of the valve renders such action both rapid and effective. The cylinder is thoroughly lagged, the crank is accurately counter-balanced, and all moving parts are provided with efficient oiling devices. Mounted upon the same bed with the engine is the generator, the armature being carried by an extension of the engine shaft and supported by an outboard bearing which is obscured in the view here presented. The armature is so constructed that thorough ventilation is secured through ducts between the windings, which serve in the capacity of a blower when the armature is moving. The magnet ring is of cast steel, and the pole pieces are provided with shoes, which, as shown, nearly encompass the armature. The design is such as to provide for sparkless operation up to 25 per cent overload and to prevent an increase in temperature over 90 degrees after 10 hours continuous running.

This single engine set is one of a series of different types of generating sets manufactured by the Sturtevant company. These sets include equipments with horizontal engines and with double-cylindered vertical engines, either of the open type or enclosed.

A telegram sent out from Chester, Pa., a few days ago was to the effect that the management of the Roach Ship Yard had decided for the present to build no more steam yachts, in view of the fact that recent advances in the cost of material have increased expenditures fully 50 per cent and that on the new basis there is no money in yacht building. There was evidently nothing in the report, as Mr. Roach says he will be glad to build steam yachts for anybody who will pay him his price. The story was certainly a strange one, as steam yachts are usually for millionaires, who would not be expected to keep an account of price if they had set out to build.

Announcement of awards of prizes has been made in the competition of the "Syndicate Maritime de France," which some time ago offered prizes for the best essays on the subject of the best possible means for preventing casualties at sea, especially those arising from fogs, and the most effectual measures to be taken for the saving of life in cases of maritime casualty. The jury appointed to examine the papers has given its award, granting five prizes, but pronounces no opinion as to the real value of the propositions made. More than five hundred papers were submitted, but only about thirty of them were pronounced by the jury to be of any real value.

AROUND THE GREAT LAKES.

A record of 41,000 tons of iron ore in twenty-four hours loading was made at the Two Harbors docks of the Duluth & Iron Range Railroad a few days ago.

Capt. George Couvrette, well known throughout the great lakes district, died at Montreal a few days ago. He was for a number of years in the service of the Calvin company, and previous to that sailed for some time between Chicago and Buffalo.

Capt. John Mitchell of Cleveland will make a trip to the Mediterranean during the winter, leaving home about Jan. 25. Capt. J. S. Dunham of Chicago will make the same trip. There are other lake vessel owners who also contemplate a trip to Europe before the opening of navigation in 1900.

In conformity with the practice of the Minnesota Steamship Co. of Cleveland, which provides names for its vessels beginning with M and ending with A, the name of the large steel steamer Pennsylvania, purchased from A. B. Wolvin and others while under construction last winter, but after she had been named, will be changed to Mataafa.

The anxiety of underwriters regarding fall cargoes of grain and their determination, after a prosperous season, to grant only such extensions of policies as they were absolutely compelled to accede to, may be understood when it is noted, for instance, that two cargoes of flax moved down the lakes in the closing days of the season by the steamers H. C. Frick and J. J. McWilliams were valued in round figures at $560,000. The Frick carried 240,000 bushels and the McWilliams 160,000 bushels.

An effort is being made by Mr. Geo. Y. Wisner of Detroit, acting as a member of the United States board of engineers on deep waterways to determine the approximate effect of shallow water on the speed of steamships. The board is collecting from vessel owners information from the logs of their vessels regarding the time of passing lights on Lake Huron and Lake St. Clair, and will thus be able to form a fair comparison of the rate of speed on Lake Huron as compared with that on Lake St. Clair.

Mr. R. L. Newman, who was in charge of the Globe yard of the American Ship Building Co. at Cleveland, and whose resignation was announced a short time ago, left for Philadelphia Wednesday to enter upon the duties of general manager of the New York Ship Building Co., which is erecting at Camden, near Philadelphia, a very large ship building plant that will be in all respects one of the finest in the country. Mr. Newman took with him as a remembrance from foremen of the Globe yard a silver smoking set.

As the Canada-Atlantic company, operating between Chicago, Duluth and Parry Sound, Ont., has only two vessels, the steamers Arthur Orr and Geo. Orr, to take the place of five Menominee line package freighters just returned to M. A. Hanna & Co., or rather to the National Steel Co., they will very probably find considerable difficulty in securing vessels to care for their lake trade next season. It would seem that the wrecked steamer Harlem could be rebuilt so as to be admirably fitted for the Canada-Atlantic service.

National Steamship Co. is the name selected for the corporation that will control hereafter the steamers Parks Foster and Ira Owen, purchased recently from Messrs. Clough, Foster and others of Elyria, O. The vessels are chartered to carry ore next season. Officers of the new company are: President and general manager, A. McVittie of Detroit; vice-president, J. G. Keith of Chicago; secretary and treasurer, M. E. Farr of Detroit. Messrs. F. E. Kirby and C. B. Calder of Detroit are members of the board of directors.

When properties of the Lake Superior Iron Co. were purchased by Carnegie interests a short time ago, the Cleveland-Cliffs Iron Co., of which Mr. W. G. Mather of Cleveland is president, shared in the purchase to the extent of one-fourth of the whole. It has therefore been arranged that of the six steel vessels included in the transfer, two, the Andaste and Choctaw, will hereafter be controlled in the office of the Cleveland-Cliffs company. The four remaining under Carnegie management are the Jolliet, La Salle, Wawatam and Griffin.

As an instance of the remarkable change that has taken place in the value of wooden vessels on the great lakes on account of the high freights of the past season, it is noted that the steamer V. H. Ketchum, sold a few days ago by the Mock-Becker interests of Cleveland to Capt. George England and others of Detroit for $55,000, was bought eight years ago on the same day in December at exactly the same price by the late Capt. Wm. S. Mack from Pickands, Mather & Co. The transfer in both cases was made through Mitchell & Co., brokers. In this period of eight years there were times when it was thought the older class of wooden vessels would never again be worth one-quarter of the prices at which they are now selling.

Glancing at a card on his desk announcing the death of Capt. James J. Clark of the Detroit Fire & Marine Insurance Co., which occurred at his home in Detroit several days ago, a Cleveland vessel owner said: "It is not right to say of Capt. Clark that he was not appreciated to the full extent of his worth while living. No one connected in any way with lake shipping was more highly respected. All that has been said of his business capacity and integrity, modest, gentlemanly and courteous manner will be endorsed by vesselmen from one end of the lakes to the other. They all met him often during the many years when he was the leading spirit in the Detroit Fire and Marine company." James J. Clark was born in Oswego, N. Y., Oct. 1, 1833. He was elected secretary of the Detroit company March 10, 1868; became a director Jan. 8, 1884, and was elected vice-president May 12, 1891.

Reference was made in these columns some time ago to patents held by A. H. Wolf of West Dover, O., on appliances designed to raise sunken vessels, and in which Mr. N. J. Boylan of the Pittsburg & Chicago Gas Coal Co., Cleveland, is also interested. Mr. Wolf's plans contemplate the construction of two large pontoons of whaleback design, which would be so shored and strengthened as to withstand great pressure of air, enough, he says, to lift 28,000 tons from a depth of 100 feet. He directs attention to several unsuccessful attempts that have been made of late to raise vessels sunk in deep water on the lakes and also to the great expense involved in raising steel vessels, even in the shallow waters of the rivers. He has patents fully secured and says he is willing to unfold the whole scheme, in order to secure the assistance of capital in its promotion, as he is unable to provide the large sum of money that would be required in constructing the pontoons, purchasing air compressors, etc.

It is the intention of the Review to present with the close of the year a list of transfers of lake vessels, on account of the great number of changes in ownership, especially in wooden vessels, that have taken place during the past season. The list will very probably show that James Corrigan of Cleveland (Corrigan, McKinnie & Co.) has been the principal purchaser of wooden craft. He had ore to move for which vessels of medium size were required. In the beginning it was thought that he was treading on dangerous ground in wholesale purchases of vessels of this class, but it would now seem that if he had not bought the vessels it would have been absolutely impossible for him to move his ore. He has the ships for another year that will be practically a repetition of the one now drawing to a close, and in serving him in the sale of ore as well as the carrying of it, they will probably pay for themselves in the two seasons. Mr. Corrigan had at the opening of the present season the steamers Bulgaria, Caledonia and Italia and the schooners Amazon, Australia, Polynesia and Tasmania, seven vessels. Now he has twenty-two vessels and their combined capacity in a single trip is about 53,000 gross tons. The addition of fifteen vessels, all purchased within a few months, includes the steamers Emory Owen, Robert Wallace, M. M. Drake, Iron Duke, Iron Chief, Progress, Iron Age, Minnesota and Quito, and the schooners Michigan, Ewen, Jno. M. Hutchinson, Iron Cliff, Halloran and Ashland.

STEAM COVERING BUSINESS.

A representative of the Review who has been visiting manufacturers in the east during two or three months past says: "In regard to the steam covering business, I find that all negotiations for a combination are off, because the Keasbey & Mattison Co. would not go into it. Dr. Mattison told me he thought 'every firm ought to stand or fall on its own bottom.'" In other quarters it was said that Manville of Milwaukee had bought H. W. Johns' western business and that Johns was selling a good many of Manville's coverings in the east; also that the Johns company had been doing everything they could to hold down expenses lately and had succeeded quite well on this score. Whether they had also cut off part of their trade remains to be seen, as all the covering concerns are always busy at this time of year, and the results could not be seen until spring. Other representatives of the steam covering trade are noncommittal. They had a bad scare while the attempt at a combination was in progress and don't know yet where they are standing. They are selling everything they can get and hoping that they will be allowed to continue as in the past. What frightened them was the attempt of the proposed combination to buy outright all the sources of raw material such as asbestos, mineral wool, clay, magnesia, etc. The Keasbey & Mattison Co. is the largest manufacturer of magnesia in the country, utilizing the finer products in the drug trade and the refuse in the coverings. Magnesia is a staple in the covering line, and so the combination failed upon the refusal of this company, as it would have been a fight between magnesia and mineral wool versus the combination.

TRADE NOTES.

A new branch office has been established at 453 the Rookery, Chicago, by the Watson-Stillman Co., New York, manufacturers of hydraulic machinery, tools and supplies.

The Bullock Electric Mnfg. Co. of Cincinnati, is advertising for bids to extend its main building 200 feet. This will make the company's main machine shop 500 feet long by 101 feet wide. The large volume of business that has been booked by the Cincinnati company from all parts of the world during the last six months necessitates the enlargement of its works with all possible haste.

In times like the present, when there is opportunity for everybody to get a share of business, the concerns that have been most reliable and upright in business methods throughout good and bad years, profit most by the improvement. They are usually found with all the work their establishments can possibly handle. Mr. W. Fogg of 195 Front street, New York, well and favorably known as a manufacturer of mattresses and bedding, writes that he has enjoyed a full measure of prosperity in the year now drawing to a close.

Subscribers to the Review who have been receiving it through the marine post office at Detroit will avoid the loss of December numbers if they will inform this office at once of addresses for the coming winter.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of Dec. 13, 1899.

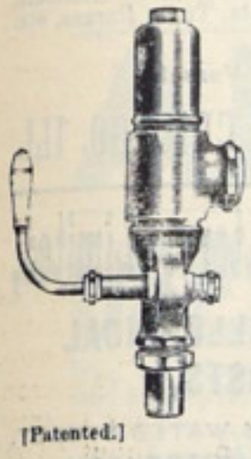
NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire	38⅞	39¼	36½	36½
American Steel & Wire, Pfd	90¼	90¼	88½	88½
Federal Steel	56	57⅛	54	54
Federal Steel, Pfd	78½	78⅞	76	76
National Steel	39	39½	38	38
National Steel, Pfd	92½	92½	91	91
American Tin Plate	26	26½	25	25
American Tin Plate Pfd	.....	.....	.....	.....
American Steel Hoop	42	43	40	40
American Steel Hoop, Pfd	82¼	82¼	80	80
Republic Iron & Steel	20⅜	2 ⅝	19	19
Republic Iron & Steel, Pfd	68	68	67½	67½

INCREASED USE OF FIRE-PROOF WOOD.

As an indication of the increased use of fire-proof wood, it is interesting to note that the new building code of New York city, just compiled, provides that when the height of a building exceeds twelve stories, or 150 feet, the sleepers and floors may be of wood treated by some process approved by the board of buildings to render the same fire-proof. The inside window frames and sash, doors, trim and other interior finish may be of wood similarly treated. The American Wood Fire-Proofing company of Bowling Green building, New York, well known to ship builders by reason of the quantities of fire-proof wood which they are furnishing for vessels, are making preparations to meet the increased demand for their product that will undoubtedly result from this tendency to put fire-proof material into all kinds of new structures.

THE KENNEY FLUSHOMETER

FOR FLUSHING WATER-CLOSETS.



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NO CUP LEATHERS OR SPRINGS.

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Showing application of Flushometer.

Used by the U. S. War and Navy Departments—Transports Grant, Sheridan, Burnside, Terry, Hooker, Thomas, Sedgewick, Meade, Crook, McClellan, Sherman. Also Albany Day Line Steamers, and others.

THE KENNEY COMPANY,

[Patented.] Catalogue? 72 to 74 Trinity Place, NEW YORK.

CAPT. GEO. A. SIMPSON, Expert Compass Adjuster,
19 YEARS EXPERIENCE.
Yearly Contracts Solicited. Nautical Instruments Repaired.
OLD 'PHONE No. 319. SAULT STE. MARIE, MICH.

FOR SALE.

Hulls, Machinery and Boilers of the Steamers Ivanhoe and R. L. Gordon, upper works having just been destroyed by fire. Can be turned into Passenger Boats or Steam Barges. Ivanhoe, iron hull. The Gordon has wood hull, rebuilt spring of 1899. Good as new. Apply B. L. Newman, 2032 Michigan Avenue, Chicago.

AMERICAN WOOD FIRE-PROOFING CO.

GUY PHELPS DODGE, President.
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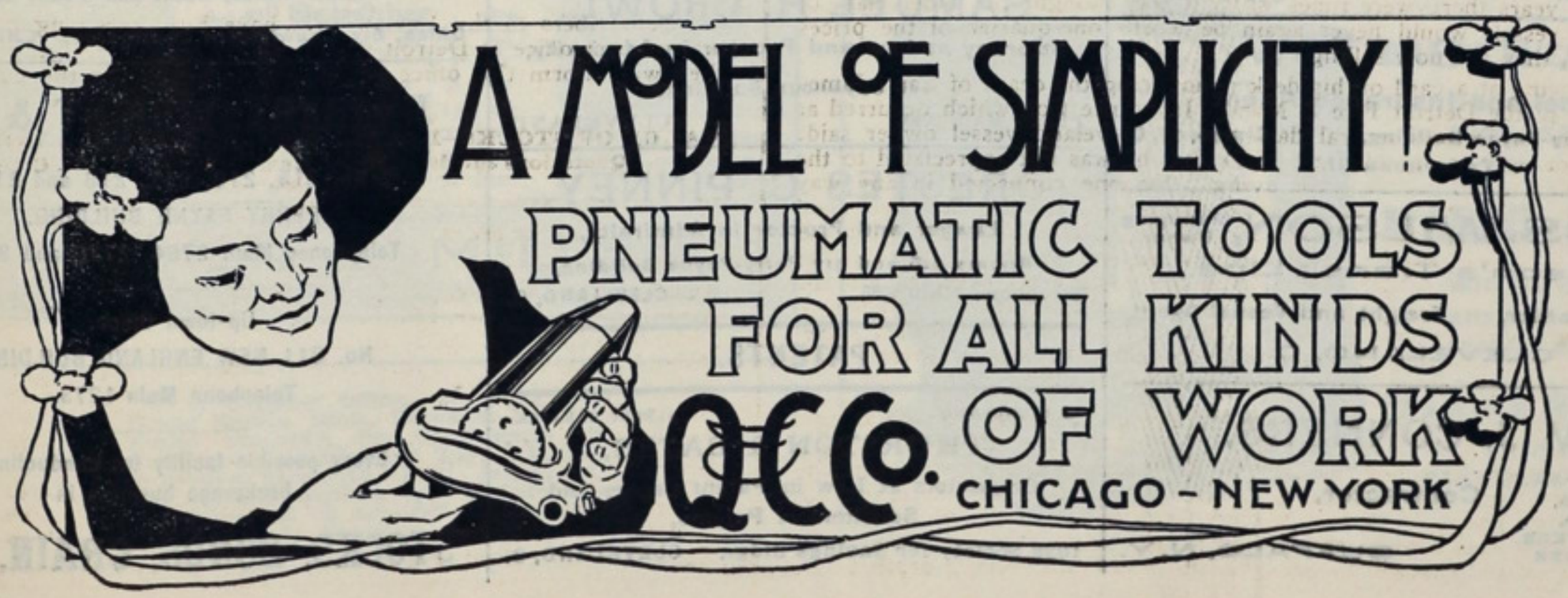

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CALVIN CARR. CHICAGO, ILL.
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MITCHELL & CO.
Vessel and Insurance Agents,
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Office Telephone 767. Residence, John Mitchell, Doan 341.
John F. Wedow, 158 L. Alfred Mitchell, Doan 197 J.

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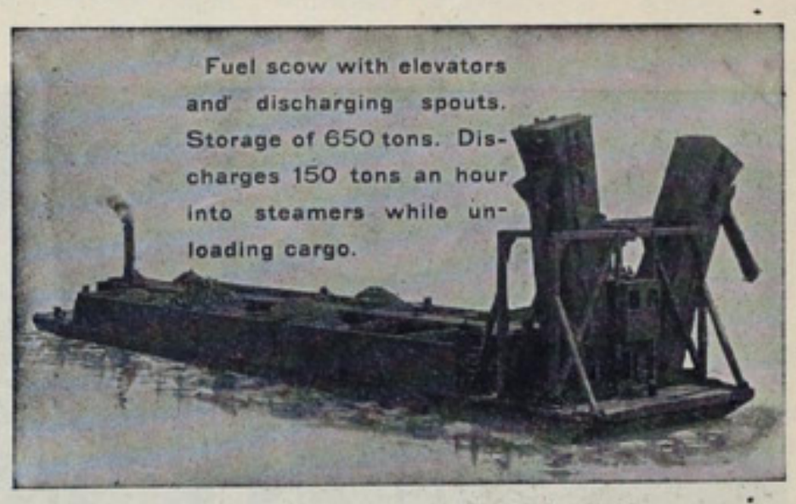
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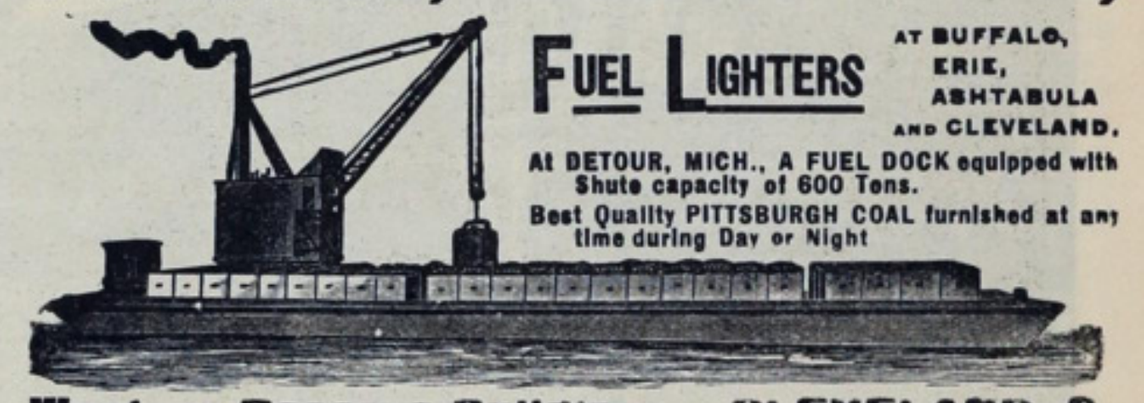

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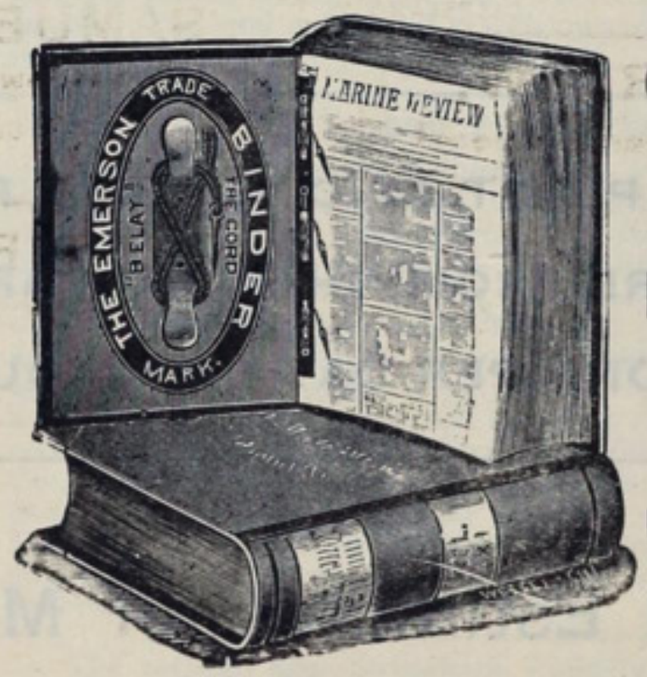

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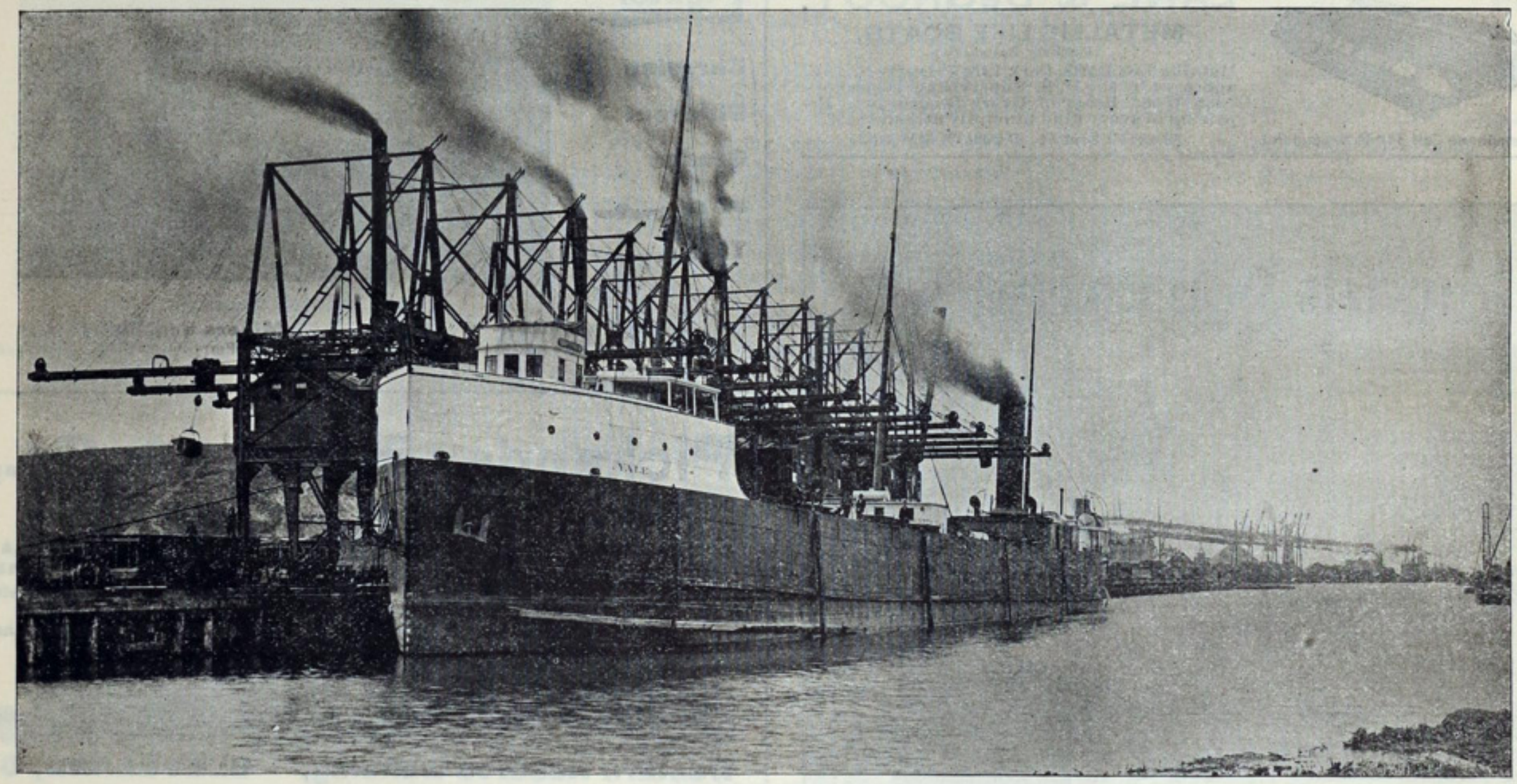

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